

MOTOR AGE

A CHILTON PUBLICATION

NOVEMBER 1961



From 35¢ at newsstand

'62
TRUCK
ROUND-UP

BULK RATE
U.S. POSTAGE
PAID
ESTON, PA.
PERMIT NO. 7

MOTOR AGE
Chester & 66th Sts.,
Pittsburgh, Pa.

WHY
THE "PROS"
PREFER
PERFECT CIRCLE
PISTON
RINGS...

PERFECT CIRCLE PISTON RINGS ARE INSTALLED AS ORIGINAL FACTORY EQUIPMENT IN 95 BRANDS OF VEHICLES AND ENGINES

FULL CIRCLE FIT

DISTRIBUTES RAIL PRESSURE MORE EVENLY

The broad flange area of the "98" oil ring expander-spacer is in almost continuous contact with the rails all the way around the cylinder. This full-circle fit distributes the force of the expander-spacer more evenly than in rings with fewer, widely-spaced flange areas—means good conformability and slow rate of wear.

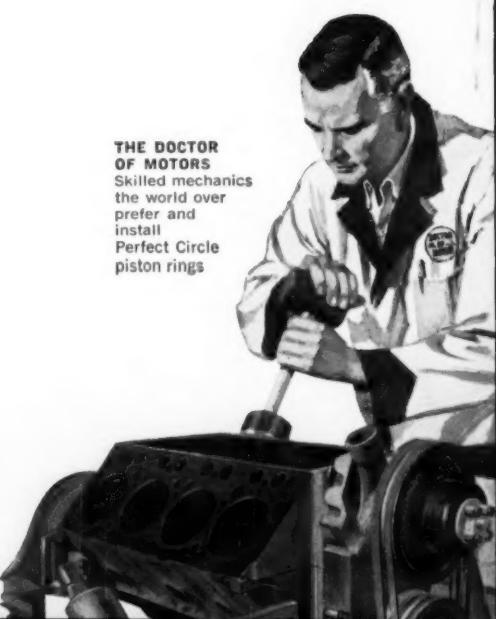
As a result, the "98" delivers positive oil control right from the start, and maintains it for thousands of extra miles. Full-circle fit is another reason why Perfect Circle rings are preferred by so many leading engine and vehicle manufacturers, fleet operators, race drivers and mechanics the world over.

For maximum conformability and better performance, always install Perfect Circle—the rings the "pros" prefer.

THE DOCTOR OF MOTORS
Skilled mechanics the world over prefer and install Perfect Circle piston rings

PERFECT CIRCLE

PISTON RINGS • POWER SERVICE PRODUCTS
HAGERSTOWN, INDIANA • DON MILLS, ONTARIO, CANADA



**ANOTHER BLUE STREAK
SECRET SERVICE TIP FOR YOU.**

SHERLOCK MCKANICK and MIKE

"The case of the
SWITCH THAT ALMOST BURNED"



I'LL JUST CONNECT THIS JUMPER SWITCH TO TURN OVER THE ENGINE WITHOUT TURNING ON THE ENGINE...

HOLD IT, MIKE! MAKE SURE YOU'RE CONNECTING THAT JUMPER PROPERLY. IF YOU DON'T, YOU'LL BURN OUT THE NEUTRAL SAFETY SWITCH THAT YOU FIND IN MOST CARS WITH AUTOMATIC TRANSMISSIONS.



RIGHT! HERE'S ANOTHER EASY WAY TO TURN THE ENGINE OVER WITHOUT TURNING ON THE IGNITION. JUST DISCONNECT THE WIRE RUNNING FROM THE COIL PRIMARY TO THE DISTRIBUTOR.

I GET IT! THAT WAY I CAN USE THE KEY IN THE IGNITION SWITCH TO TURN THE ENGINE OVER FOR THE COMPRESSION TEST. AND, OF COURSE, I MUST REMEMBER TO RECONNECT THE PRIMARY WIRE WHEN I'M FINISHED.



PLAY IT SAFE, M'BOY! REMOVE EXISTING CONNECTIONS AT THE NEUTRAL SAFETY SWITCH **BEFORE** TESTING! THAT'S THE PROPER WAY TO AVOID APPLYING BATTERY TO THE SWITCH.



MECHANICS:
THERE'S NO EXCUSE FOR A BURNT-OUT NEUTRAL SAFETY SWITCH! LET **BLUE STREAK** HELP YOU!



WRITE NOW FOR **BLUE STREAK** SERVICE BULLETIN #90, "HINT FOR BETTER ELECTRIC SERVICE" STANDARD MOTORS PRODUCTS, INC., 37-18 NORTHERN BLVD., LONG ISLAND CITY, NEW YORK.

YOU'RE SO SMART, MIKE, YOU KNOW ALL ABOUT ENGINES AND EVERYTHING.

I SURE DO MAKE ALL THE RIGHT CONNECTIONS WHEN I READ MY **BLUE STREAK** SERVICE BULLETINS.

WORLD'S FOREMOST HEAVY-DUTY IGNITION LINE



REGULATORS • SWITCHES • COILS • CONDENSERS • CONTACT POINTS • WIRE AND CABLE

“...reliable, considerate, responsible people”

says DAVID H. GEZON, Studebaker dealer, Grand Rapids, Michigan

“We control 90% of our finance business, so it's most important that we handle it through reliable, considerate, and responsible people. We have found all these things true of Commercial Credit Plan in our 10-year association. Commercial Credit provides us with a flexible plan tailored to meet our customers' needs. Their willingness to cooperate on borderline cases has helped us develop many fine customers over the years. And Credit Life Insurance, which is included in almost every deal, has made many friends for us.”

***Commercial Credit
serves successful dealers***

For complete information on how our service can help promote your success, call or write the Commercial Credit Corporation office nearest you.



Electronically Cured



A-V CORK GASKETS

HAVE
IT!

more natural resilience for tight, sure sealing

Oil pan rails, for example, take a lot of abuse. But see how the Armstrong-Victor cork gasket compensates for any mating surface irregularities and makes a perfect seal. A-V cork has *more natural resilience* than any other gasket material. That's why A-V cork gaskets out-seal others. Electronic cork curing—the new A-V way—not only preserves the natural liveliness of raw cork, but makes the cork composition denser and stronger. A-V cork gaskets cost no more, so why not use the best? Your Victor Jobber carries complete stocks—in sets and individual parts.

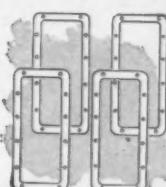
With A-V gaskets you get:



GREATER RESILIENCE—Compression-recovery tests prove A-V gaskets retain the resilience needed for tighter, longer lasting seals.



INCREASED FLEXIBILITY—Electronic baking makes A-V gaskets more pliable and break-resistant. They are easier to handle, easier to install.



MAXIMUM UNIFORMITY—Electronic baking cures the cork composition evenly and thoroughly to give A-V gaskets uniformity of density, strength and flexibility.



Only genuine
A-V cork gaskets
have this trade-mark—
the two notches.

Victor Mfg. & Gasket Co., P.O. Box 1333, Chicago 90, Ill. Canadian Plant: St. Thomas, Ontario.

Armstrong-VICTOR CORK GASKETS

The 100% Coverage Line—for Cars, Trucks, Tractors, Stationary Engines

MOTOR AGE

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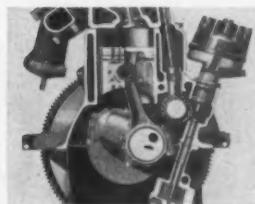
Mercury Meteor



Chevrolet's 1st 50 Years



1962 Truck Story



Internal Combustion Engine

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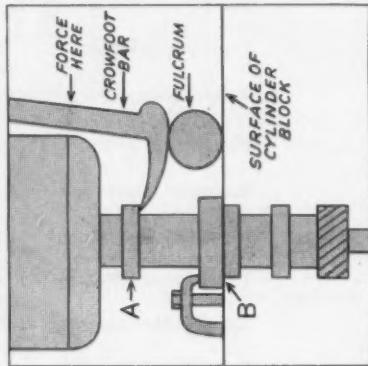
CAR and TRUCK shop kinks

\$25 for KINK of the month \$10 paid for other KINKS

Kink of the Month

Removing Ford Distributors With Crowbar And Socket

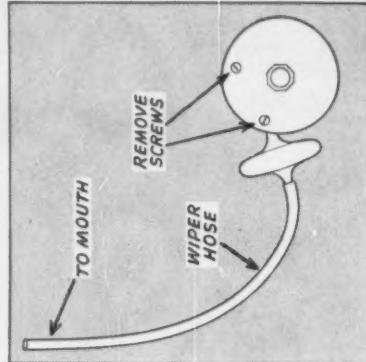
J. E. Davidson, 1653 McFarland Rd., Pittsburgh, Pa.



125. Use a socket or any similar object as a fulcrum, and the familiar "Lady's slipper" or get bar to pry the distributor up-and-out of the engine. As the distributor rises out of the block, the rotor will turn. Observe the position of the rotor when it stops turning. Set it to that position when installing.

Replacing Vacuum Advance Unit The Easy Way

Dennis Postema, 109 East Filer St., Ludington, Mich.



126. You can install vacuum advance without removing distributor by putting one end of an 18 inch piece of wiper hose in your mouth. This causes enough vacuum to move breaker plate to expose screws. This saves having to hold breaker plate over with one hand while you remove advance with the other. Install the same way.

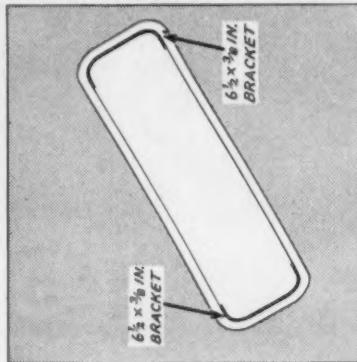
Preventing Door Courtesy Switch From Sticking

Harry Tishman, 823 E. 49th St., Brooklyn 3, N.Y.

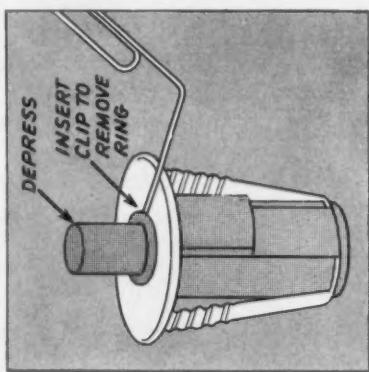
127. Here is a simple way of conditioning door courtesy switches that do not make contact when doors on '61 Buicks and other cars are opened. Press plunger down to face of switch. With the use of an open paper clip "fish" out rubber seal from under face of switch. Pull seal out. Switch will now operate 100 per cent perfect.

How To Cure Oil Leak On Chevy Corvair Valve Covers

John H. Hovis, 801 S. Church St., Charlotte, N.C.



128. I have found a cure for leaking Chevy Corvair valve cover. This can be made from metal binding. The bracket is cut and then bent to fit the inside of the cover. It is placed in cover with $1/8$ inch sticking up. Then spot solder the bracket to cover. This forms a well for the gasket to fit into. This eliminates the leakage.





They don't lose tension

This American Hammered stainless steel oil ring never loses more than a negligible percent of its original, built-in tension. Stainless steel is practically unaffected by combustion heat • This means the ring holds its fit in the cylinder bore, even in badly tapered and out-of-round bores. It exerts the proper tension at all times . . . provides a freer running engine . . . delivers unsurpassed oil control. American Hammered, Automotive Replacement Division, Sealed Power Corporation, Muskegon, Michigan.

U.S. Pat. No. 2,789,872

AMERICAN HAMMERED



stainless steel oil rings



THIS NATIONAL SYSTEM pays for itself in less than two years.



GERTRUDE S. HUNT, SEC'TY.
TREAS. of Homer Heller, Inc.



MODERN SHOWROOMS of Homer Heller, Inc.

"Our **NCR** Accounting System saves us \$4,600 a year... returns 64% annually on investment!" — Homer Heller, Inc. Escondido, Calif.

"The superior performance of our National System has made it indispensable to our business. During the two years we have been using it to handle our 750 accounts, all records have been in balance and up-to-date. And our National doesn't stop there..."

"We have been able to eliminate 80 overtime hours per month in the preparation of statements. Saving \$300 a month over our previous method! The National prepares all accounts payable and receivable, sales and cost analysis, and our pay-

roll. We now have records that give us complete management control with speed and accuracy. It is the ideal System for any automotive business.

"As a result of all these features, our National Accounting System saves us \$4,600 a year. This is a return of 64% annually on our investment!"

Gertrude S. Hunt
Secretary-Treasurer
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Your business, too, can benefit from the many time- and money-saving features of a National System. Nationals pay for themselves quickly through savings, then continue to return an extra regular yearly profit. National's world-wide service organization will protect this profit. Ask us about the National Maintenance Plan. (See the yellow pages of your phone book.)



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ACCOUNTING MACHINES
ADDING MACHINES • CASH REGISTERS
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THE NATIONAL CASH REGISTER COMPANY, Dayton 9, Ohio
1039 OFFICES IN 121 COUNTRIES • 77 YEARS OF HELPING BUSINESS SAVE MONEY

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For Those Who Sell Filters... and Want to Sell MORE!



WIX Oil and Air Filters are built to give the car owner extra value and greater engine protection...WIX-O-MATIC, the soundest merchandising system in the filter industry, gives you more sales and bigger profits. This statement is proved by thousands of dealers who know from first-hand experience how WIX-O-MATIC stimulates sales and stops losses.

With WIX-O-MATIC you never lose sales by "being out of" the filter you need...you never lose money because of excess inventory or obso-

lete numbers. And—sales are made quicker! With the Dial-O-Matic Cartridge Selector you can tell at a glance what filter is needed for any American-made car or light truck that drives in—most foreign cars, too. WIX-O-MATIC is available with wall racks for small stocks and floor cabinets for more active locations, and you get both FREE.

Get all the facts on WIX Oil and Air Filters and WIX-O-MATIC merchandising from your jobber, or write direct. Do it today.

WIX CORPORATION • GASTONIA, N. C.

In Canada: Wix Corporation Ltd., Toronto

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How Top Brake Shops Build

Brake relining today is big business, accounting for over \$700 million in sales each year! *Quality* workmanship coupled with a *quality* brake lining can help you get your share of this big market. So why not start now to boost your '61 profits! Start by using the sound, tried-and-true installation methods used successfully by thousands of professional brake mechanics to prevent annoying comebacks and build repeat business.

Let's begin at the beginning. A car has just pulled into your shop and the driver has complained that he's having trouble with his brakes. Just by pushing the brake pedal you can learn plenty. Check free play of the brake pedal with your hand. It should be from $1/4"$ to $1/2"$ on most non-power brakes. With power brakes, free pedal should be anywhere from $1/16"$ to $1/8"$. Now push the pedal with your foot. If it binds or locks you have another valuable clue. It indicates possible trouble in the pedal linkage, mounting or master cylinder.

Pressure build-up should be smooth and constant. If pressure builds up, then drops off sharply, it may be a sticking master cylinder, wheel cylinder, or partially blocked hydraulic line . . . usually a hose. When you make the pedal test you are also checking

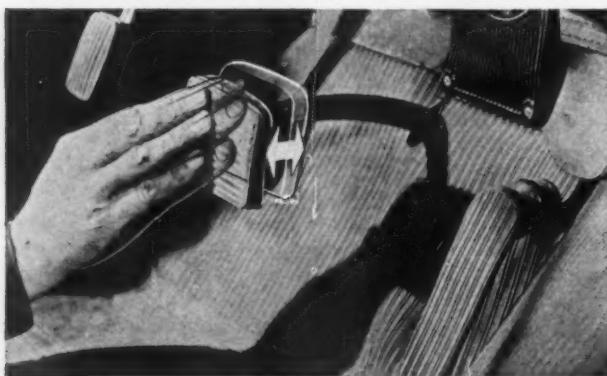
pedal reserve. If reserve is low, it indicates the need for brake work, or at least an adjustment.

If the pedal "floor-boards" when you press it down, it is an indication of low fluid level in the master cylinder, excessive shoe travel, or a leak in the hydraulic system. So pump the pedal. If pressure builds up, it indicates that the shoes are moving too far. An adjustment or reline job is in order.

In performing a reline job, each brake part should be checked as it is removed. This checking-as-you-go speeds the job and allows you time to procure any parts required that might not be in stock. Check the wheel bearings and grease seals carefully when the front drums are removed. Always replace the seals when doing the complete brake job.

Drums should be turned in pairs. The two front drums and/or the two rear should be turned to the same diameter. Always check the drum diameter before and after turning. If the diameter is more than $.060"$ over the standard drum diameter, replace the drum. Remember that brake drums are heat reservoirs. They absorb a lot of heat during braking. The less metal the drum has, the less the drum's capacity to absorb heat properly.

If drums have been turned, be sure to use



Free play: $1/4"$ to $1/2"$ on most non-power brakes,
 $1/16"$ to $1/8"$ on most power brakes.



Each part should be checked as it is removed to speed job.

Volume Repeat Business!

proper thickness American Brakebloc lining. Check the lined shoe in the brake drum. It is recommended that from .005" to .012" clearance be allowed at each end of the long lining segment. Never allow clearance between center of lining and drum. This is a sure-fire cause of noise, as well as a contributor to brake pull.

Check the cylinders thoroughly. Wheel cylinders are a very critical part of the brake system. Extreme care should be taken to prevent dirt or abrasive elements from getting into the cylinder area. Use only alcohol or brake fluid for cleaning these parts.

When you install the brake shoes be sure you have them in their proper position. Check your American Brakebloc service manual for complete details. After you have installed the brake shoes and springs, make a final inspection to be sure every part is in its proper place before installing the drum. Brake drums are easily distorted when tightening wheel lugs. Never completely tighten one wheel lug before starting the others.

Completely bleed the brake system before making adjustments. A power or pressure bleeder is recommended. Start bleeding the wheel cylinder farthest from the master cylinder. In cases where there are two wheel

cylinders on a brake, bleed the lower one first. Allow sufficient fluid to flow through each wheel cylinder to insure a complete flushing of the system and remove all air.

If brake is of such design that it has adjustable anchors, give it a very careful and complete major adjustment. If brake does not have adjustable anchors, then proceed with minor adjustment. In the case of servo or self energizing brakes, back off star wheel adjuster 14 notches from a tight brake.

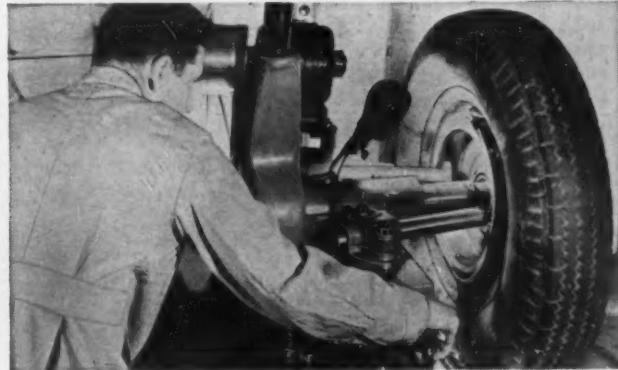
Needless to say, every job which leaves your shop should be the very best job it was possible for you to do. (Never return a car to the customer with *any* drag between lining and drum.) Satisfied customers mean repeat business. They also are your prime new business builders. The good word gets around . . . and you profit by it! (Just as you will profit by using high-quality American Brakebloc on all your relining jobs!)

**American
Brakebloc®**

P. O. BOX 21 • BIRMINGHAM, MICHIGAN



Check wheel bearings and grease seals carefully.



Drums should be turned in axle pairs.



"Acme's Color Eye System speeded up our work by 200% and cut costs at least 100%" *

—reports WALTER HUDSON
owner, Hudson Chevrolet Co.
Stamps, Arkansas

Acme's Color Eye System is "easy to work with" . . . "increases production and department earnings" . . . "improves the quality of finishes" . . . "decreases waste of paint colors in stock" . . . "puts 4000 colors at our finger tips." These are just a few of the comments from Mr. Hudson and his employees at Hudson Chevrolet in Stamps, Arkansas.

Whether your paint shop is large or small, Acme's Color Eye System can save you time and increase your profits, too.

1. You save inventory costs, because you stock only basic Acme intermixing colors.

2. You save material costs, because you mix only the amount of paint needed for each job.
3. You save time, because you don't wait for paint delivery or hunt for colors.
4. You get perfectly matched colors, because you get "laboratory accuracy."
5. You have happier customers, because you can make faster deliveries on better paint jobs.

For more information on the Acme Color Eye System, see or call your nearest Acme automotive jobber or write directly to Acme Quality Paints, Inc.

*National average savings for paint shops using the Acme Color Eye System is approximately 33½%.

ACME
AUTOMOTIVE FINISHES
ACME QUALITY PAINTS, INC.
DETROIT 11, MICHIGAN • TRINITY 2-4800
BURBANK, CALIFORNIA, THORNEWALL 2-7158 • DALLAS, TEXAS, BROADWAY 8-2158

**ACME SPEEDY-SAND
PRIMER-SURFACER
547 PEARL GRAY**

It's New—It's Light Gray—It's Non-settling. Recommended for acrylic and general use.

One of the complete family of Acme Automotive Refinishing Products



WALTER HUDSON



B&D Sander-Grinders 60% faster, get your equipment rolling faster!

Try a B&D 7" H. D. Sander-Grinder in your own shop—watch it hog metal as much as 60% faster than anything you've ever seen. You'll find B&D Sander-Grinders run cooler, allowing longer continuous operation. Perfect overall balance and light weight assure less operator fatigue. Hot exhaust air is blown away from user.

To speed body sanding, grinding, cutting, brushing; to smooth welds, remove rivets, cut off studs fast, call your B&D jobber or mail coupon for a demonstration of a B&D 7" Sander-Grinder.

REMOVE MATERIAL 60% FASTER under maximum load conditions. Cut down time with a hard-working B&D Sander-Grinder.

BODY SANDING GOES FASTER with the operator in control at all times. B&D Sander-Grinders ready work for paint—fast!



Black & Decker Tools are sold by leading distributors everywhere. For sales or service look in the Yellow Pages of your telephone book under



Black & Decker®

CUTS MAN-HOURS TO MINUTES

THE BLACK & DECKER MFG. CO., Dept. 5111
Towson 4, Md. (In Canada: Brockville, Ont.)

- Please arrange a demonstration of Sander-Grinder
 Please send additional information on _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



Drills



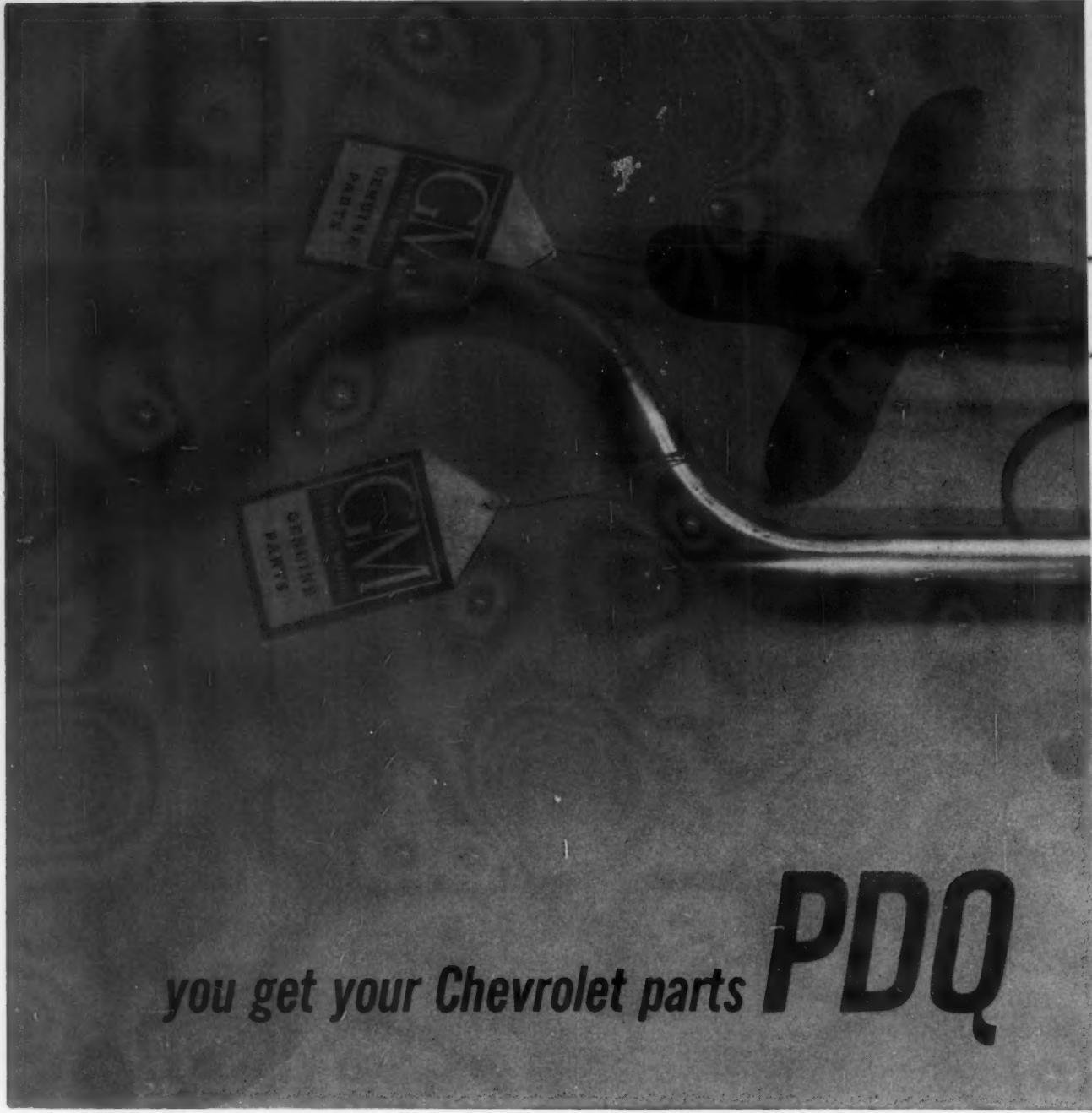
Vacuum
Cleaners



Polishers

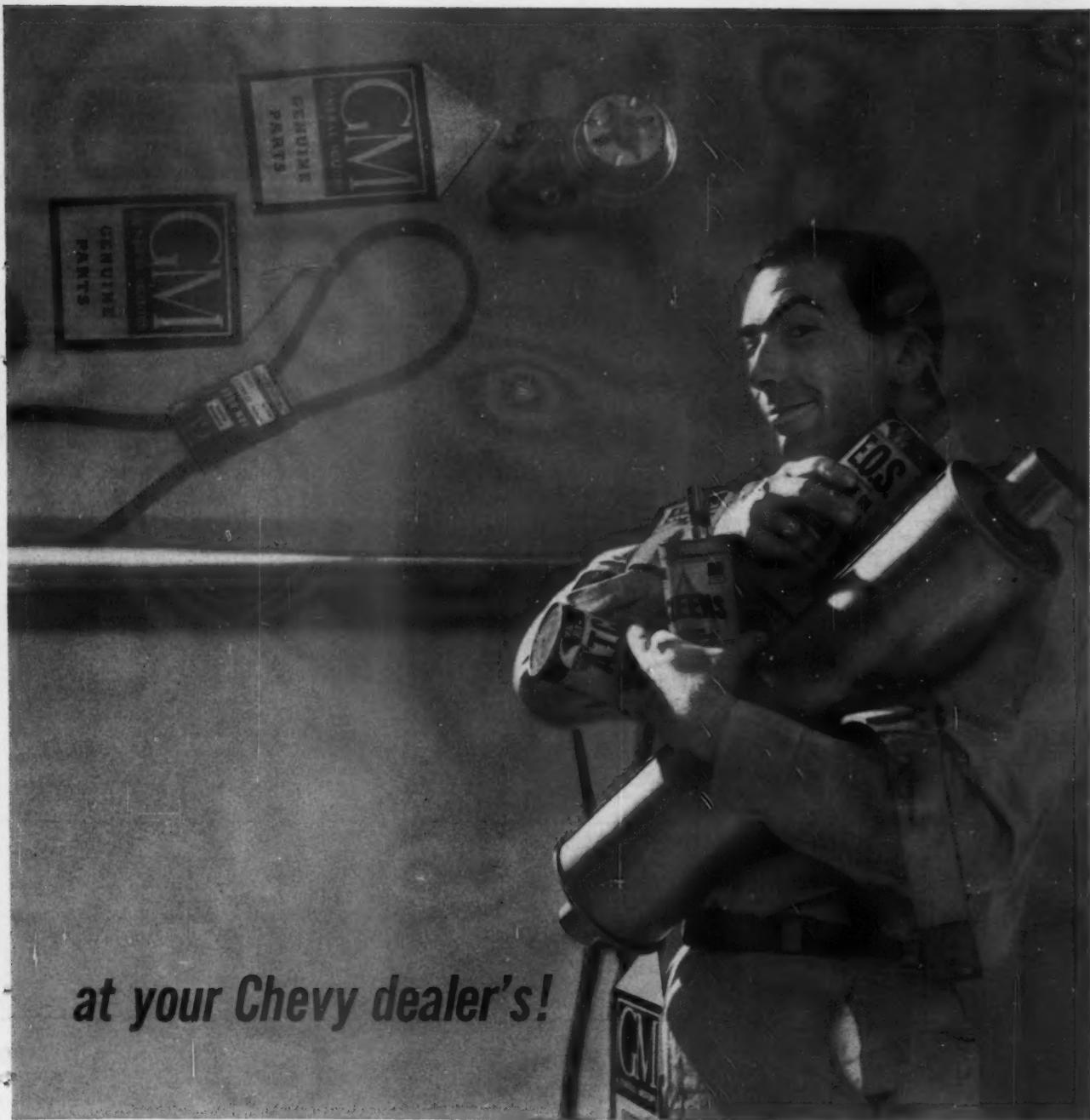


Valve
Refacers



you get your Chevrolet parts **PDQ**

You'll keep steady customers and gain new ones
when you use genuine GM Chevrolet parts
for faster, easier, reliable repairs that help
keep customers' Chevies the Chevy-est



at your Chevy dealer's!

PARTS DELIVERED QUICK—isn't that what you want? Well then, get the PDQ service that goes along with parts orders filled for you by your Chevrolet dealer. No strain—he's got the inventory and the know-how. Besides stocking a wide range of genuine Chevrolet car and truck parts, Chevrolet dealers are backed by teletype-quick service from any one of 41 strategically located warehouses. It's good business to know what you're getting—and when. And with your Chevrolet dealer's PDQ service you know you get the finest parts promptly. Make him *your* partner in service. A phone call to him will set you up PDQ, so buzz him today.... Chevrolet Division of General Motors, Detroit 2, Michigan.



Win



RAMCO

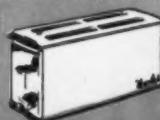
3 MONTHLY CONTESTS!

600 CHANCES TO WIN!

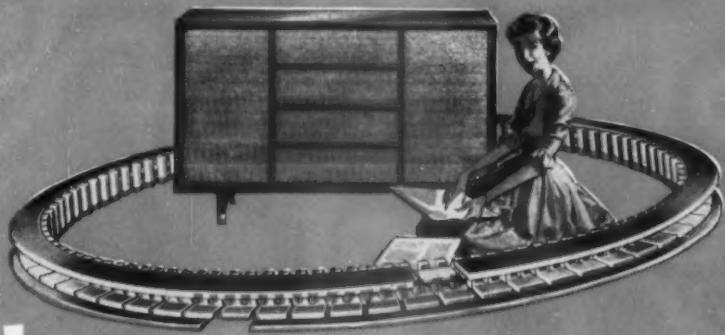
Someday soon you may get a "Winning Ring" on the phone, with the news that you have won your choice of a 1962 Corvair Monza or Rambler American Station Wagon—plus a flight to St. Louis and expense money to drive your prize home! The Ramco jobber's man who serves you will win a duplicate prize. These are the top prizes in each of three big monthly contests. You compete with entrants in your own area, can enter each contest many times. You can get free official entry blanks from your Ramco jobber or jobber's representative. Each entry competes for 200

prizes in one of the three monthly contests. **HERE'S HOW:** Simply complete and mail your entries, following the simple rules on the blank. Use your judgment and knowledge of the automotive service industry to answer the questions shown here. Your skill in matching the importance of these six Ramco C-9 features to the order in which they are rated by Ramco engineers, plus your knowledge of the ring business in estimating the total number of entries received nationally, can win you big prizes. Call your Ramco jobber today!

CONTEST VOID IN STATES WHERE TAXED OR PROHIBITED BY LAW.



one of six 1962 compacts

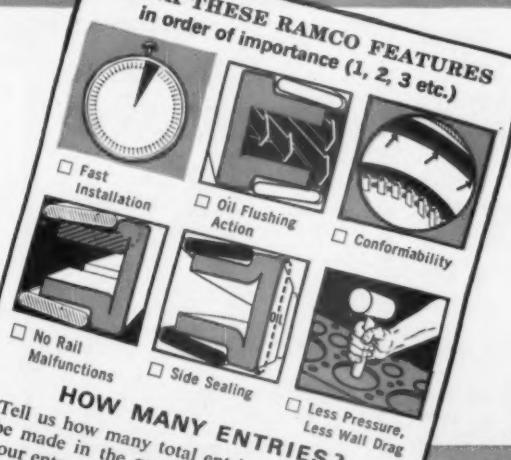


12 stereo consoles

or one of 582 other
valuable prizes

"winning ring" contest

RANK THESE RAMCO FEATURES
in order of importance (1, 2, 3 etc.)



HOW MANY ENTRIES?

Tell us how many total entries you think will be made in the contest during the month of your entry. (Clue: Industry data shows that an average of 350,000 sets of replacement piston rings are sold each month through automotive-parts jobbers.)

RAMCO
rings you on the phone



Every "Winning Ring" winner will be notified by phone. That's your chance to make a choice of prizes in your winning category (described on entry blank).

Contest No. 1 closes Oct. 10. Contest No. 2 closes Nov. 10.

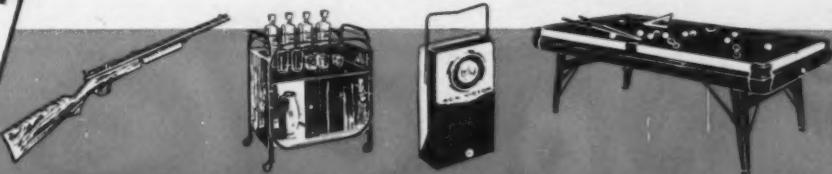
Contest No. 3 closes Dec. 10.

Postmarks on entries will control the particular contest in which your entries compete. Enter now and often! Call your Ramco Jobber today.

RAMCO
RAMSEY CORPORATION

MODERN POWER
PISTON RINGS
• ST. LOUIS, MISSOURI

A subsidiary of Thompson Ramo Wooldridge Inc.





"My Yellow Pages advertising brings in at least 10 calls a day!" says R. R. Walsten, owner, Automatic Transmission Clinic, Minneapolis, Minn. "Most of the calls I get that haven't been developed through personal references come in through the Yellow Pages. My Yellow Pages ads bring in jobs that range from \$6 to \$300! I just finished a \$50 job the Yellow Pages brought me. The Yellow Pages is doing so well for me that a major part of my advertising appropriation goes into the Minneapolis and St. Paul directories!"



Display this emblem. It builds your business!

Display ad (shown reduced) runs under TRANSMISSIONS—AUTOMOTIVE. Call the Yellow Pages man at your Bell Telephone Business Office to plan your program.

Automatic Transmission Clinic

• SERVICING • ADJUSTING
• REPAIRING • REBUILDING • Exchange Units
of All Types
EAST PAYMENT PLAN—WHOLESALE & RETAIL—PICKUP & DELIVERY
Personalized—Guaranteed Service

ATCO
PARTS DISTRIBUTOR
REMANUFACTURED PARTS
REBUILT PARTS
REBUILT TRANS.
308-25 AV S.E.

FEDRL 3-5527

1032
WASH AV SE
TWO BLOCKS EAST
OF 10TH ST.
FOOTBALL STADIUM

1 DAY SERVICE BY APPOINTMENT



Check up before you crack up!

Fair warning: The shock absorbers on your car were not put there just for comfort. They are primarily safety devices designed to keep your tires on the road and your car under control. So don't risk life and limb on worn, dangerous shocks. Have yours checked regularly, starting the very next time you visit your service station or garage.

Get Gabriel Ajustomatics

If you need new shocks (and if you have gone anywhere near 20,000 miles on your present ones, you most certainly do), tell the man you want Gabrieles. Gabriel offers several models. Chances are you will want the heavy-duty Ajustomatic, which lets you select the kind of ride you want, for the kind of driving you do.

Best idea is to drop in where you see the orange-and-black sign of a Gabriel Shock Absorber Specialist. That way you'll not only be sure of getting the best shocks made . . . you'll be dealing with a man who knows what he's talking about.

Play it safe. Have those shocks checked now.

Also: The Gabriel Load-Absorber



Not a mere "helper spring" contraption, but an entirely new air-cell device that prevents dangerous over-sag and side-sway under heavy loads . . . delivers a safer, more comfortable ride under all load and road conditions. For a perfect ride, get Ajustomatics as front and Load-Absorbers in back!

Tune in Martin Achronsky with "News In Depth" every weekday evening over NBC Radio, presented by Gabriel.



TIE IN! SELL THE "CHECK UP" BEFORE YOU CRACK UP" IDEA WITH GABRIEL!

We've done the spade work with eye-stopping ads like the one shown above . . . in TRUE, SPORTS ILLUSTRATED, SATURDAY EVENING POST, HOT ROD, MOTOR TREND, and MOTOR LIFE! Now . . . make the most of it by checking every car you get on the lift, and by reminding every motorist that

shock absorbers are primarily safety devices, designed to help keep his tires on the road and his car under control.

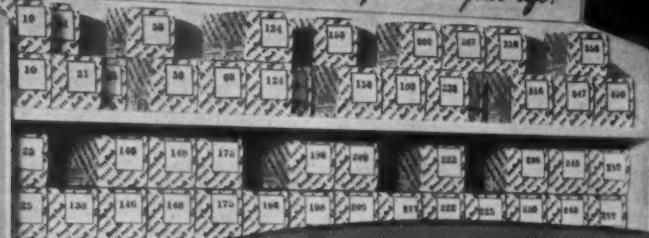
Remember: every motorist who drives into your place of business wants safety for himself and his family. Gabriel shocks help provide safety for him . . . and sales for you!

THE GABRIEL COMPANY • Cleveland 15, Ohio
GABRIEL OF CANADA, LTD. • Toronto 14, Ontario



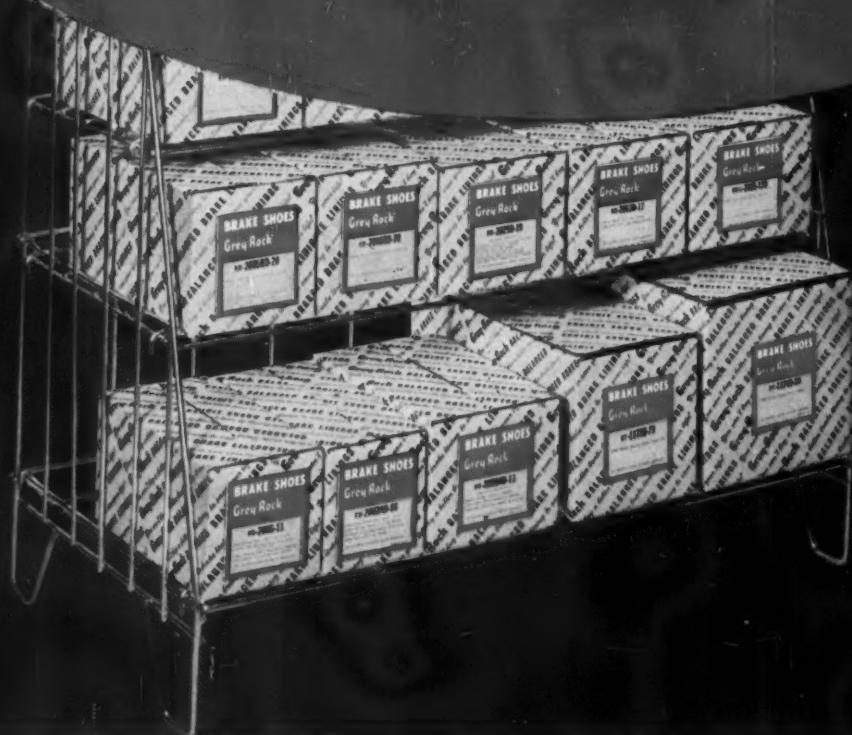
Grey-Rock

GREY ROCK
You can't buy a better brake lining to save your life!



Grey-Rock

QUALITY TELLS-and SELLS!



... in brake linings, parts, fluid

Copper-Woven Lining



QUALITY BRAKE LININGS Copper-Woven Lining stands unchallenged as the greatest advance in brake lining in years. Brakes cool faster, fade is practically eliminated, linings wear longer. Used in combination with dry-process molded lining for most Bendix Brakes, it gives them a new kind of balanced action and even wear.



QUALITY BRAKE PARTS AND FLUID You can't buy or sell a better brake parts line than Grey-Rock. Line includes master and wheel cylinder assemblies, repair kits, and system components; brake cable and hose; and the highest quality brake fluid available.

... in service equipment



DELUXE 2-GAL. BLEEDER The finest on the market. Makes "bleeding" a one-man operation. No pedal pumping. Automatic air pressure safety valve and pressure gage. Safety ball check valve prevents air getting into hydraulic system. Extra rugged housing. Complete with adapters, fittings and storage box for bleeder parts.

Quality is the key to success in any phase of the brake business. There will always be cheaper products, but no one will ever make or sell a higher quality line of brake lining, parts and fluid than Grey-Rock. Why? Because brakes deal with the safety of

people—you, your friends, your customers. And because strict adherence to highest standards over the years has paid off—for Grey-Rock, for you, for your customers. Quality will keep Grey-Rock a leader in the years ahead. Grey-Rock now offers you a



1-GAL. BLEEDER Finest in its low-price category. Ideal for smaller volume shops. Automatic safety valve. Complete with full line of adapters and fittings.



BRAKE CYLINDER HONE Improved design with longer, self-aligning flexible shaft permits honing right on the car. Suitable for all master and wheel cylinders from $\frac{3}{8}$ -in. to 2-in. diam.

full line of quality products for brake service. If you want to build a sound business based on quality products . . . with safety for your customers . . . see your Grey-Rock jobber now. Grey-Rock Division, Raybestos-Manhattan, Inc., Manheim, Pa.

Only **Grey-Rock** makes **BALANCED BRAKE LININGS**®

BRAKSETS • TRUCKSETS • BLOCKS • BRAKE PARTS & FLUID • VEE-LOK® FACINGS • AUTOMATIC TRANSMISSION PARTS

You Can't Buy a Better Brake Lining to Save Your Life



"MY \$1.25 GREASE JOBS HELP ME SELL OVER 100 G-E HEADLAMPS A MONTH," says Jim Dario of Medford, Mass.



My \$1.25 grease job builds a lot of traffic—and gives us a lot of opportunities to look for dim or burned out headlamps. When we find one, we suggest a General Electric replacement. That just about clinches the sale. You can't beat brand merchandise. I average better than 100 G-E headlamp sales a month—more during inspection months.

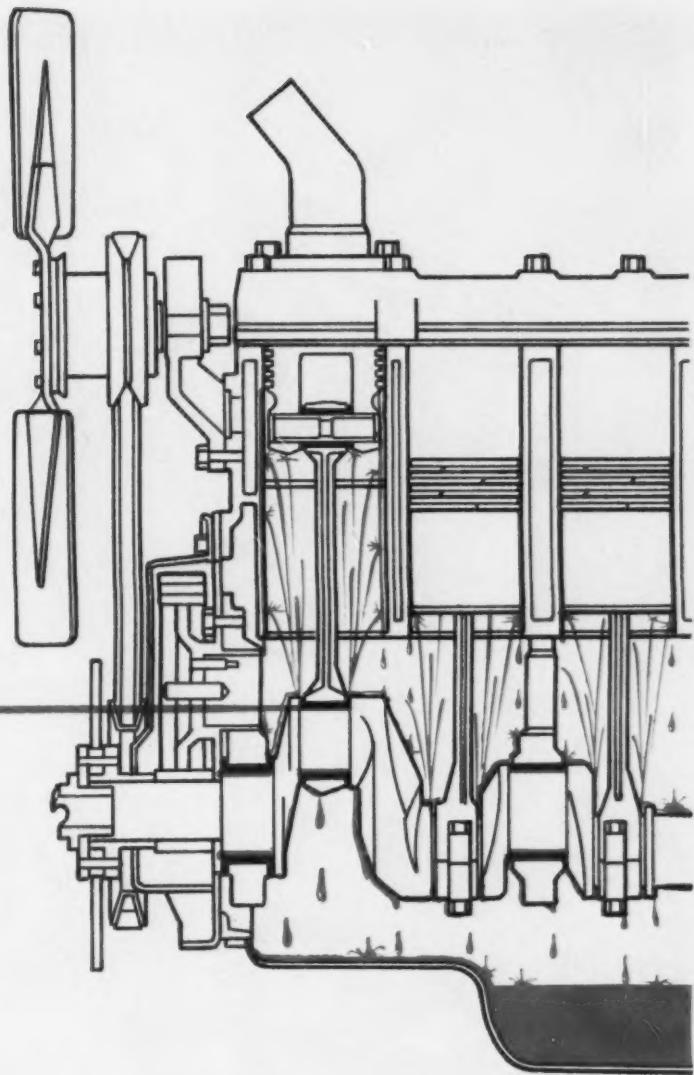
"I have all my men on an incentive system and tell them to check tail lights, dome lights, dash lights—the works. They turn up plenty of lamp sales by looking for them when the car is on the grease rack or in the driveway."

Smart service station operators everywhere are making extra profits by looking for headlamp and bulb sales. And they're replacing burnouts with dependable General Electric lamps. It's the brand most people prefer. See your G-E bulb supplier and make sure you have a full stock on hand. General Electric Co., Miniature Lamp Dept. M-148, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL  **ELECTRIC**

Why precision bearings are vital here



Engine bearings have two vital jobs. They provide a low-friction surface for journals to ride on. But equally important, they control the oil throw-off, due to the spinning action of the shaft, that lubricates and cools cylinder walls and other engine parts.

Exact tolerances are needed in engine bearings and shaft diameters to get the kind of precise "clearances" needed to control oil throw-off. *Too little clearance*—an error of less than .001"—may result in an overheated bearing and early bearing failure due to insufficient lubrication.

Too much oil clearance is equally harmful to proper engine performance. If oil clearance is changed from

just .0015" to .006", the oil throw-off (shown above) increases 25 times. And even the best piston rings can control only about a 5 times normal amount of oil. The excess oil then slips past piston rings into the combustion chamber where it clogs piston rings and builds up combustion chamber deposits.

Federal-Mogul knows, as you probably do, the importance of oil clearances. That's why **Fm** bearings are manufactured to tolerances as close as $\pm .000125"$ — $1/16$ the thickness of a human hair. Why take a chance on anything less than precision engine bearings? You can be sure of a satisfied customer when you use the best. See your Federal-Mogul jobber.

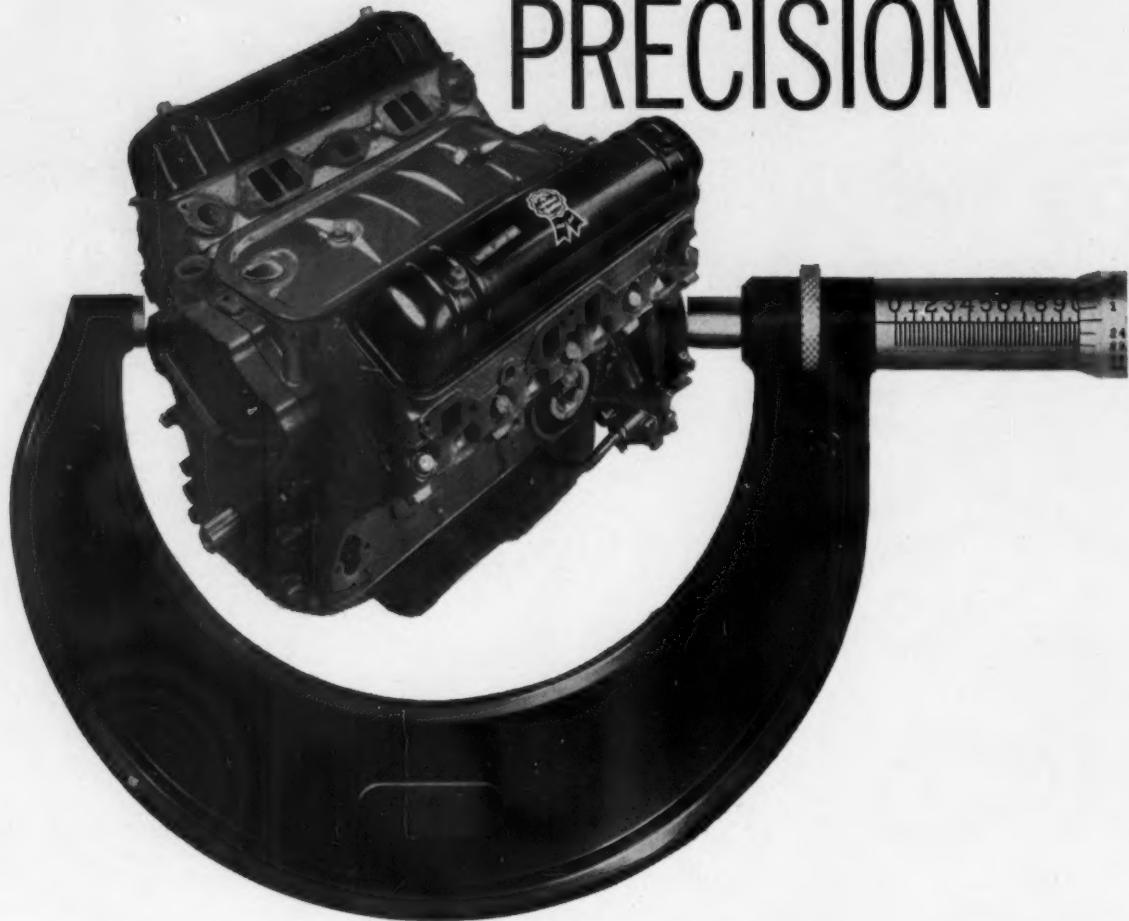


FEDERAL-MOGUL ENGINE BEARINGS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

PRECISION



IF THEY'RE NOT AS GOOD
AS NEW . . .



THEY'RE NOT
FORD AUTHORIZED

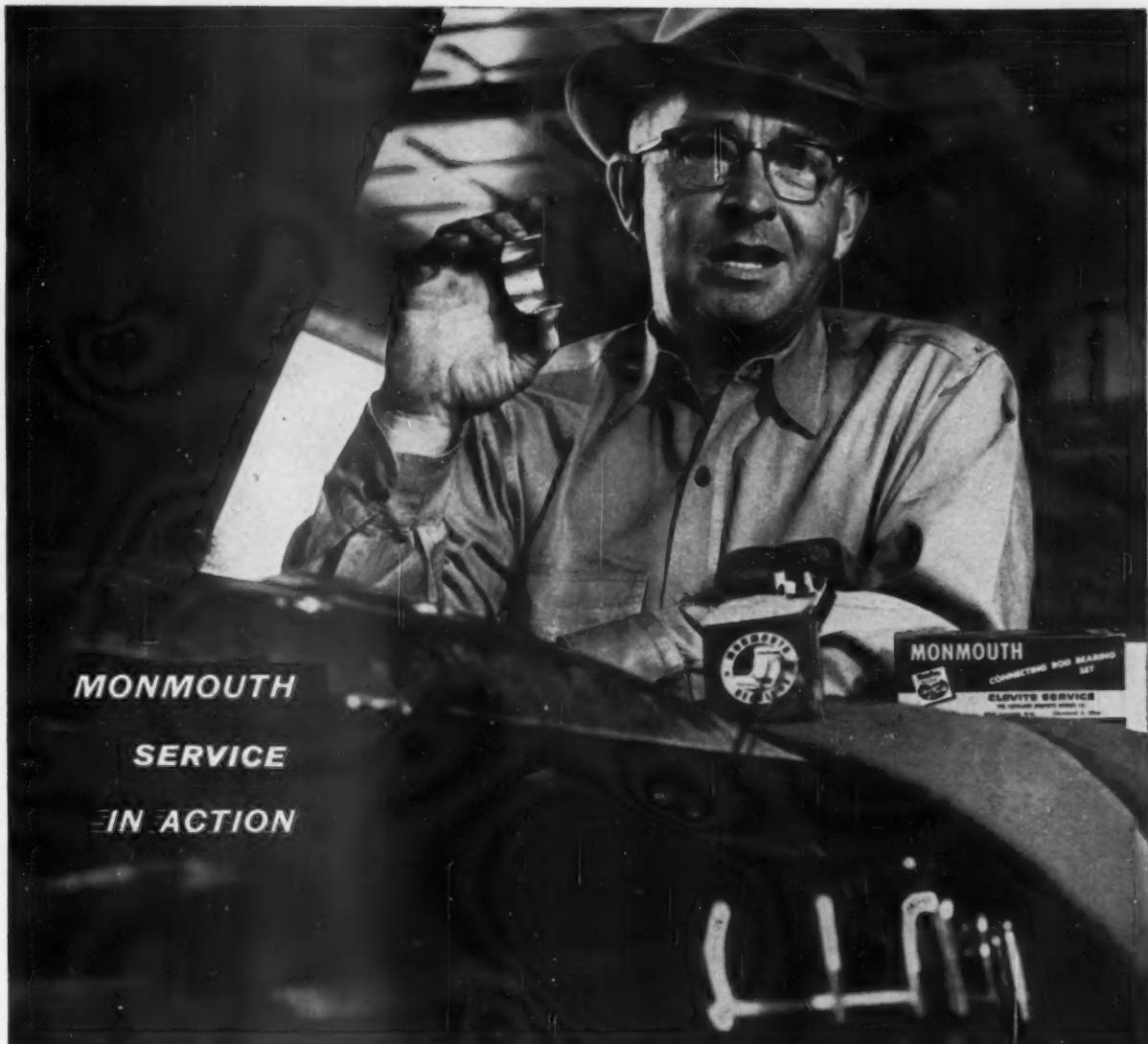
Precision checking of each machining and assembly operation—performed by skilled technicians—is the reason for the quality of Ford Authorized Reconditioned engines, transmissions and small parts. These are the *only* products remanufactured to Ford Motor Company specifications. They carry the Authorized Reconditioners Seal . . . your assurance of good-as-new quality from the inside out.

Your Ford dealer is the source for the complete line of Ford Authorized Reconditioned engines, transmissions and small parts. Every one you buy is built for service . . . priced for savings.

There is no finer replacement unit. Your Reconditioners' Warranty proves it.

See your local Ford Dealer

FOR THE COMPLETE LINE OF FORD AUTHORIZED RECONDITIONED
ENGINES • TRANSMISSIONS • SMALL PARTS

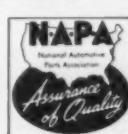


"Monmouth really concentrates on service . . .

... that's why I depend on Monmouth. I can get any bearing I want, as fast as I need it, just by calling my NAPA jobber. And I know Monmouth stands behind my jobber in making a product that's tops in quality. You can't beat that combination of quality and service. It makes my business a lot simpler and more profitable."

If you want performance that pays off, use Monmouth Bearings in all your engine rebuilds. For instant service, call on your NAPA jobber. He can give you complete Monmouth service on all your engine bearing requirements.

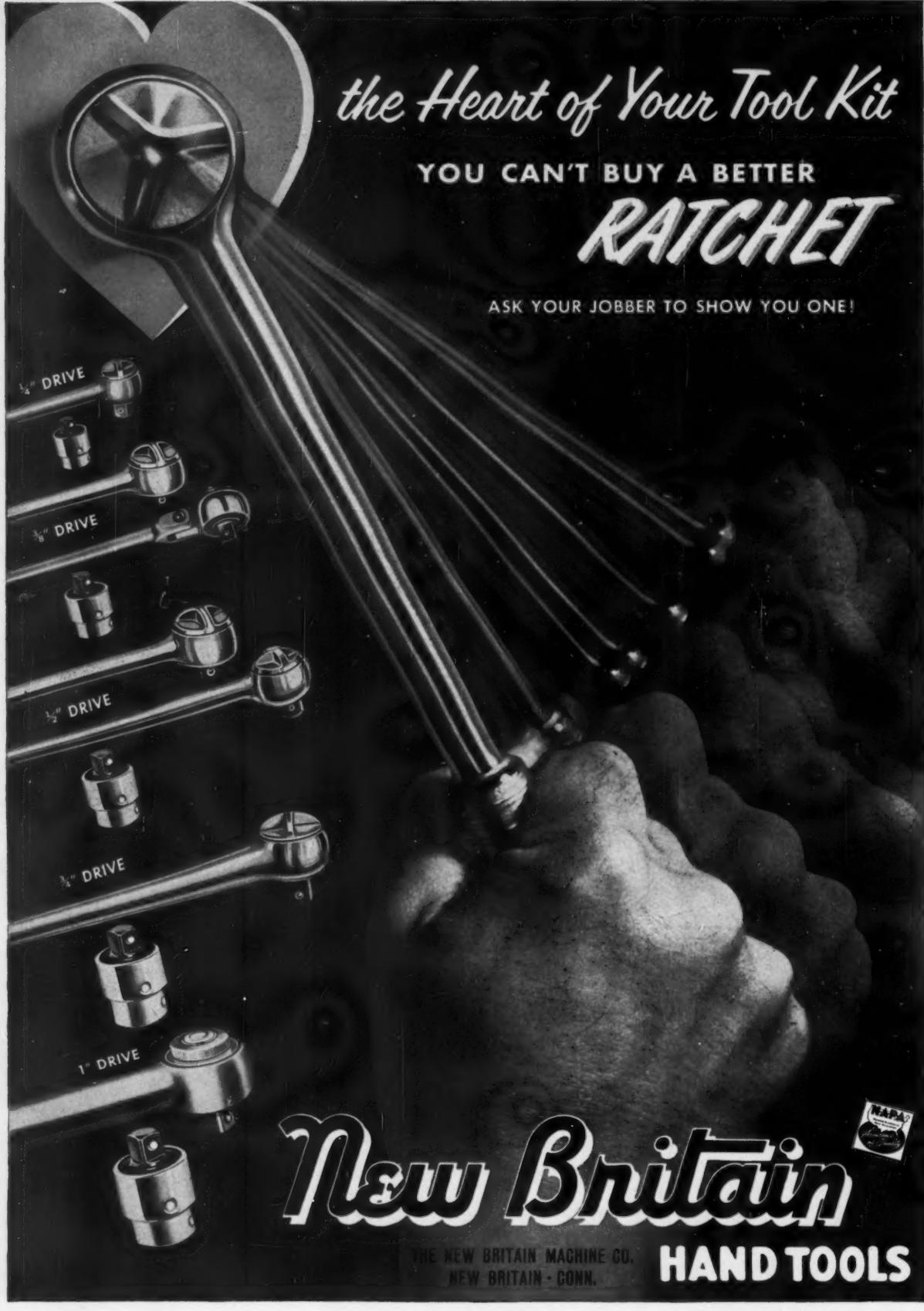
says Flake Wells, Jr., Owner
Wells Garage
El Paso, Texas



MONMOUTH Engine Bearings

CLEVITE SERVICE: Cleveland Graphite Bronze • Division of Clevite Corporation • Cleveland 3, Ohio





the Heart of Your Tool Kit

YOU CAN'T BUY A BETTER

RATCHET

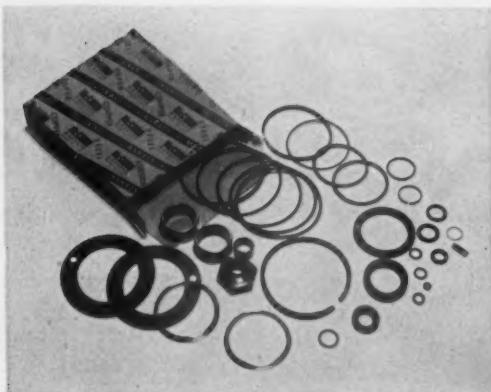
ASK YOUR JOBBER TO SHOW YOU ONE!

New Britain

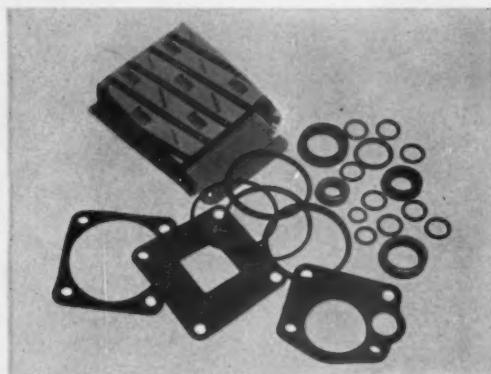
THE NEW BRITAIN MACHINE CO.
NEW BRITAIN - CONN.

HAND TOOLS

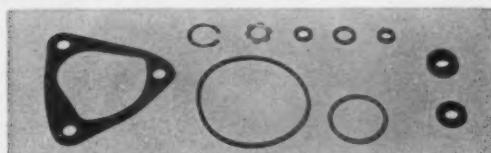




MASTER OVERHAUL SETS—Complete rebuilding packages containing required replacement parts for particular assembly . . . complete, easy-to-follow instructions included with each set.



FACTORY SERVICE SETS—For partial repairs not requiring master set. Include seals, O rings, gaskets as contained in factory service sets.



BULK PARTS—For your convenience, McCord also makes available the most frequently used individual parts.



HOSE ASSEMBLIES—Pressure and return hose assemblies? . . . McCord offers a full line.

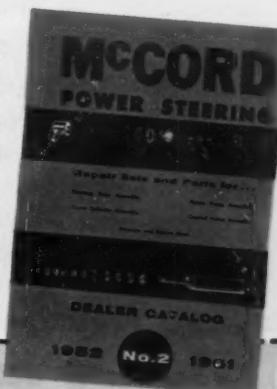
NOW!

POWER STEERING SERVICE SIMPLIFIED

McCORD offers you the most *complete line* of Power Steering Repair Sets and individual parts available! Whatever you need McCord has it, for all popular types of power steering units from 1952 forward.

McCORD offers you the finest cataloging in the industry. Rapid-reference indexing . . . by car make, application, factory part number and matching McCord number . . . permits you to quickly, easily find *exactly* what you need.

Yes, McCord power steering parts and McCord cataloging enable you to perform faster, better power steering service. And with a growing market that *today* exceeds 13 million vehicles there are greater profits ahead for you! Cash in on it . . . with McCord.



McCORD

CORPORATION • DETROIT 11, MICHIGAN

Please send McCord Power Steering Catalog #2.

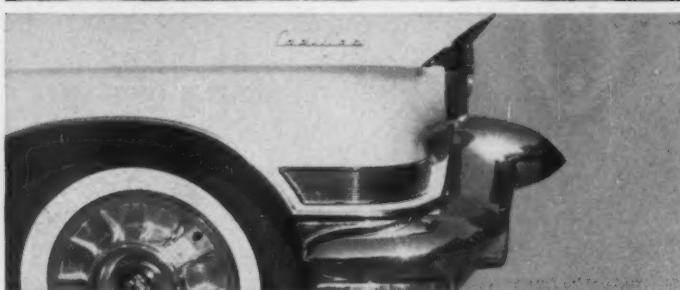
Name _____

Address _____

City _____ Zone _____ State _____

exclusive sales

you get *A*Ction with



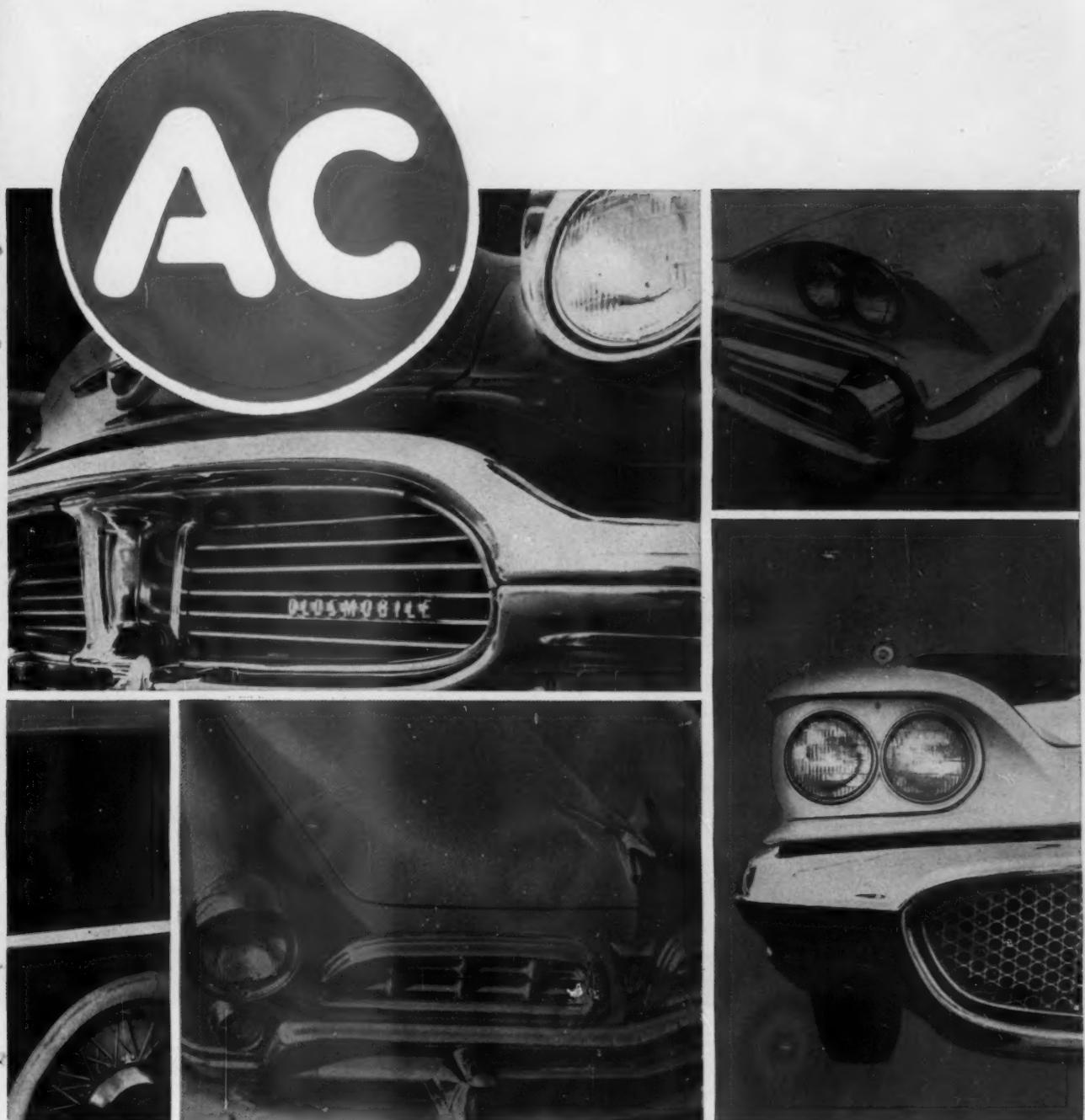
You can sell Self-Cleaning ACTion to All your

By today's standards, first-class spark plug performance in any automobile, new or old, calls for self-cleaning spark plugs. To the alert serviceman, this means AC Fire-Ring Spark Plugs because AC—and only AC—makes spark plug types that are self-cleaning in the fullest sense of the word . . . for every car on the road.

Some designs simply rely on added exposure of the insulator tip and electrodes to combustion gases for "self-cleaning" action. What's more, these extended tip spark plugs are suitable for use in certain cars only.

AC Fire-Ring Spark Plugs have deeply recessed insulator tips of extremely thin construction. They heat fast and cool fast with each combustion chamber explosion to burn off fouling deposits as fast as they form. Because of their recessed structure, they get the benefit of the swirling gases as well.

This is the exclusive AC Hot Tip feature that makes ACs truly self-cleaning spark plugs . . . that deliver superior (and longer lasting) performance and work in any car on the road today.



Customers Only with AC spark plugs

In addition, AC's exclusive extended tip design with the extended shell gives important added protection against rapid electrode wear, insulator breakage and spark plug drowning.

The AC Fire-Ring Spark Plug with the exclusive self-cleaning Hot Tip is the finest spark plug you can install. If your customers want ACtion, if you want ACtion—good will, repeat sales ACtion—recommend and install AC Fire-Ring Spark Plugs at every opportunity.

AC SPARK PLUGS THE ELECTRONICS DIVISION OF GENERAL MOTORS



 FIRE-RING
SPARK PLUGS

SURE PROFIT



You're bound to profit when you stock and sell AC Oil Filters, AC Air Filters and AC Gasoline Filters. AC filter replacement potential is the greatest in the industry because more cars come equipped with ACs than any other brand.

The AC Filter line does a top quality job of keeping engines free from harmful dirt, dust, grit and damaging sludge. They are preferred by owners whose cars have them as standard equipment—and they're easily sold to other car owners because of the AC name and the AC reputation for products of highest quality.

AC helps you sell all customers—with attention-arresting national advertising and powerful point-of-sale merchandising. AC gives you strong support to help you win greater filter volume, greater filter profits. The products themselves help build customer satisfaction and repeat sales. They are sold only under the AC name. No second brand—no private brands—no double standard of quality. You'll make money with AC. Call your AC Supplier and get started with AC . . . your best line of ACtion in automotive filtration.

AC SPARK PLUG  THE ELECTRONICS DIVISION OF GENERAL MOTORS

LINE-UP!



high profit
you get ACTION with



**OIL•AIR•GASOLINE
FILTERS**

WINS OEM

approval!

Now adopted for one or more applications by leading car factories and manufacturers of trucks, diesel engines, farm tractors, etc.

ONCE YOU TRY...YOU'LL KNOW WHY!

new FEL-COPRENE®

the new rubber gasket for cylinder head covers, crankcase and automatic transmission oil pans, etc.

Fel-CoPrene is being used increasingly for O. E. M. for the very same reason that you should be using it. Proving ground and laboratory tests, backed by several years of astonishing results on millions of cars, prove beyond doubt Fel-CoPrene is a most superior sealing material.

Fel-CoPrene is an exclusive rubber formula developed by Fel-Pro in cooperation with leading car factories. Its exceptional dimensional stability eliminates those annoying problems of fit. Even after months of storage, Fel-CoPrene does not break... become brittle... lose resiliency... or change its size. Ask your Fel-Pro Jobber for Fel-CoPrene... and get more than your money's worth... in perfect fit... and in better performance. Or write for samples and FEL-COPRENE FACT SHEET—FELT PRODUCTS MFG. CO., Skokie, Illinois, Since 1918.

FEL-PRO gaskets



specially designed
with your profit
uppermost in mind

JOBBER EXECUTIVE EDITION



PEOPLE—

The Main Ingredient

By ROBERT E. McNALLY,
Chairman of the 1961 National
Committee, YOUNG EXECU-
TIVES FORUM, Automotive
Service Industry Association

WHAT does it take to make a business? What are our major concerns in management? Surely sales, advertising, capital, production, people and so on through an endless list of business problems—they're all important.

But in operating any kind of business—and making a success of it—there is really only one problem which should be our major concern . . . PEOPLE, the main ingredient. With the right kind of people working for you, any of these other business problems can be solved.

We must learn how to get along with them—how to make them feel appreciated—treat

them fairly—and give them recognition. Unless we do this we shall never reap the reward of their abilities. Good human relations cannot be bought with a turkey at Christmas and a ham at Easter. Good human relations must be *earned*, honestly and sincerely.

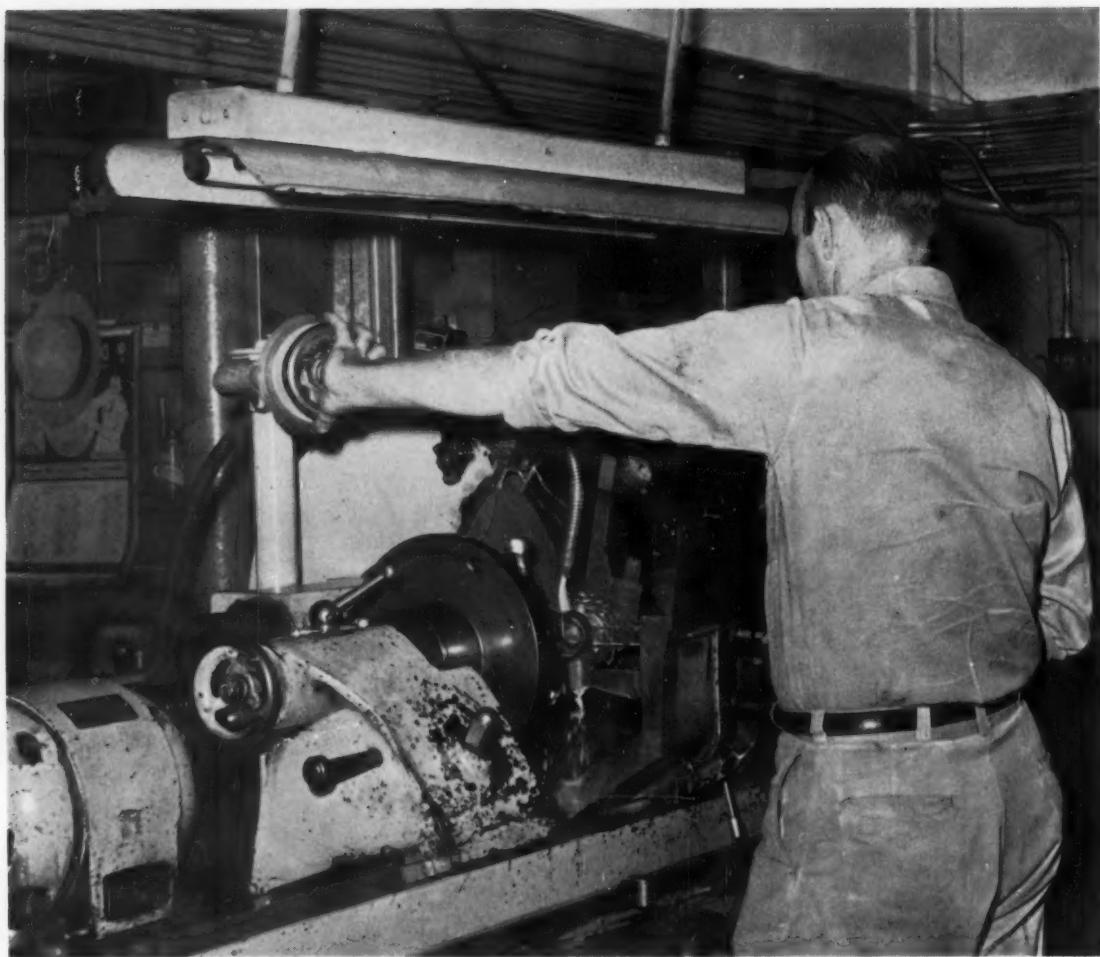
The approach is relatively simple: make an honest effort to try to determine *the basic wants common to all employees*. They are all different individuals, and want to be recognized as such. The opportunity for self-expression in their work is important to them. They want to know "why."

The day has long passed when management can afford to look

upon employees as merely the "working crew." Management cannot afford to ignore them, something *individuals* cannot tolerate. They want to be recognized, and this goes beyond giving them a once-a-day "good morning" and "good night." There is no substitute for giving them a pat on the back and recognition for work well done, when they deserve it. And when that recognition isn't forthcoming when deserved it doesn't take long for the employee to conclude that he can get by with a lot less effort.

Where possible, management should follow the work of each

Continued on page V



MACHINE SHOP OPERATORS

industry's

AUTOMOTIVE service retailers have relied on their wholesaler, or jobber, for *more than* parts, equipment, tools and supplies. Today he needs help, information and counts heavily on the jobber's machine shop more than ever.

Eighty-two per cent of the wholesalers who have mechanical service departments, or machine shops, believe that these departments are indispensable to their total wholesaling operations.

Revealed In Survey

This was revealed in a survey made recently by Automotive Engine Rebuilders Association in conjunction with MOTOR AGE. A.E.R.A. is the largest group in the world whose sole interest is the jobbers' shop operation.

With the explosion in automotive service jobs, and with the increasing number of service stations with one or more mechanics, the need for



Machine Shops represent an important source of revenue to the wholesaler and an important source of information for the trade

on any given business day these wholesalers are called upon thousands of times for mechanical advice and assistance. Each of these calls does not necessarily mean an order. On the other hand, each call creates good will for the wholesaler which, in the long run, results in more business.

Sixty-one per cent of the wholesalers surveyed have only one shop. The remainder have multiple shop operations. In some instances of multiple shop operation, the wholesaler has a complete shop at his headquarters and smaller installations capable of performing the more popular operations at his branches.

The average depreciated investment in equipment, tools and machinery is \$28,000. This ranges from \$10,000 to more than \$40,000.

The survey points out that 70 per cent of the wholesalers allocate an average of 3,382 square feet for their main shop operation. Thirty-two per cent have one to three shop employees; twenty-four per cent have 4 to 6 workmen while twenty-six per cent have 7 or more.

Overall Picture

Obviously all of these shops do not operate the same but the overall picture shows, accord-

master mechanics

a source of accurate mechanical information on specific jobs is becoming more and more important. The survey brings to light that 80 per cent of the wholesalers with machine shops receive from 1 to 10 calls a day from the trade for technical information.

Calls To Wholesalers

It requires little imagination to realize that

ing to the survey, most frequently performed operations are resurfacing with crankshaft grinding in second place. Piston work, with engine work, valve work, brake drum turning, following in that order. Electrical repairs, too, occupy a prominent position.

From a purely business angle it is important to note that twenty-three per cent of the wholesalers surveyed said shop operations were responsible for eleven to twenty per cent of their total business; twenty-two per cent indicate a whopping thirty-one to sixty per cent attributable to their shops, including parts and labor.

Continued on page VII

**THE
PULSE
OF
AUTOMOTIVE
BUSINESS**

Automotive Wholesaler's Sales and Inventories
Data from the Bureau of the Census, Dept. of Commerce

Region	Per Cent Change in			
	Sales	8 Mos.	Inventories	Aug.
Aug. 1961	Aug. 1961	from Aug. 1961	Aug. 1961	Aug. 1961
New England.....	-4	+16	-1	-1
Middle Atlantic.....	+1	+3	+1	+4
East North Central.....	+5	+9	-3	+6
West North Central.....	+1	+7	-1	+2
South Atlantic.....	-5	+4	+3	+3
East South Central.....	+6	+9	+2	+15
West South Central.....	+2	+6	-1	+2
Mountain.....	-9	+7	-3	+7
Pacific.....	+4	+6	0	+10
United States.....	+1	+7	0	+5
				0

Monthly Sales of Automotive Jobbers incl., Tire and Tube Wholesalers*

All Data Are in Millions of Dollars

Month	1961	1960	Per Cent Change
Jan.	\$ 428	\$ 403	+9.36
Feb.	401	415	-3.38
Mar.	453	453	None
Apr.	455	477	-4.81
May	477	494	-3.40
June	504	508	-0.79
July	462	448	+3.12
Aug.	493	488	+1.02
Sept.	...	...	...
Oct.	...	...	...
Nov.	...	...	...
Dec.	...	...	...
Total—12 Mos...	\$3,674	\$3,686	-0.33
Total—8 Mos...			

Monthly Sales of Franchised Car Dealers*

All Data Are in Millions of Dollars

Month	1961	1960	Per Cent Change
Jan.	\$ 2,241	\$ 2,578	-13.07
Feb.	2,154	2,670	-19.14
Mar.	2,648	3,039	-12.87
Apr.	2,484	3,119	-20.04
May	2,776	3,054	-9.10
June	2,781	3,015	-7.80
July	2,371	2,468	-3.93
Aug.	2,335	2,816	-10.74
Sept.	...	2,324	...
Oct.	...	2,688	...
Nov.	...	2,633	...
Dec.	...	2,437	...
Total—12 Mos...	\$32,701	...	...
Total—8 Mos...	\$19,800	\$22,659	-12.23

Monthly Sales of Gasoline Service Stations*

All Data Are in Millions of Dollars

Month	1961	1960	Per Cent Change
Jan.	\$ 1,381	\$ 1,386	+1.94
Feb.	1,282	1,285	-0.23
Mar.	1,429	1,387	+3.03
Apr.	1,439	1,457	-1.24
May	1,523	1,489	+2.28
June	1,568	1,524	+2.89
July	1,604	1,587	+1.07
Aug.	1,627	1,568	+3.76
Sept.	...	1,470	...
Oct.	...	1,505	...
Nov.	...	1,455	...
Dec.	...	1,511	...
Total—12 Mos...	\$17,594	...	...
Total—8 Mos...	\$11,853	\$11,853	+1.72

* Estimated by the Bureau of the Census.

**MONTHLY SALES OF AUTOMOTIVE WHOLESALERS—
INCLUDING TIRE AND TUBE WHOLESALERS**

(All Data in Millions of Dollars)



People—The Main Ingredient

Continued from page I

individual closely enough to provide this recognition and, when needed, *constructive and positive* criticism to help him. When top management cannot do this, then the job should fall to some form of first line supervision. In any event, it is a management responsibility that *cannot be overlooked*. You simply cannot afford it.

Sometimes I think we insult the intelligence of our employees by giving them that stock answer "It is company policy" without giving them the *reasons* why a certain policy or rule is in effect. It doesn't take long to give the employee an explanation about a management decision that affects him. He is *entitled* to it, and once he has the facts you've got him on your team.

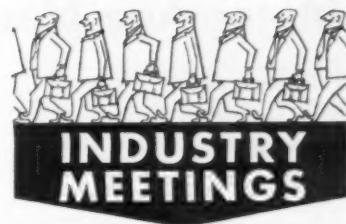
What about *self-expression*? Usually in any group of people working together there are lines of social status, whether we like it or not. Some jobs give a greater opportunity to the employee for self-expression in the exercise of skill and judgment. But in *any* job there is *some* degree of self-expression available to the employee. By making the

employee aware of this, management can often reap the benefits of a time-saving or cost-cutting idea from the employee. And this leads to recognition!

Without discounting the benefits of periodic management-employee meetings, company picnics, bonus plans and other "fringe" benefits, the most important factor in maintaining good employer-employee relations is the *day-to-day contact* these two groups afford each other. Here is where the employee gains his conception—right or wrong—of management. Here is where management succeeds or fails. And this is the point where most human relations bog down.

Let's see if we can stand a little self-analysis. Let's ask ourselves . . . Am I more concerned with sales, finance and other problems than I am with my people? . . . Have I let job descriptions, organization charts and personnel seminars take the place of real day-to-day human relations on my part? . . . When did I last give a *sincere* pat on the back to a deserving employee? . . . Have I let management's

Continued on page VII



Nov. 8-10—Automotive Parts Re-builders Assn. Convention & Trade Show, Hotel Biltmore, Los Angeles, Calif.

Nov. 8-10—Annual Convention South Carolina Automotive Wholesalers Assn., Inc., Fort Sumter Hotel, Charleston, S.C.

Nov. 16-18—Virginia Automotive Wholesalers Assn. Convention, Hotel Roanoke, Roanoke, Va.

Nov. 16-19—California Automotive Wholesalers Assn. Convention, Catamaran and Babia Motels, Mission Bay, San Diego, Calif.

Nov. 17-19—Automotive Wholesalers of Illinois Convention, St. Nicholas Hotel, Springfield, Ill.

Nov. 27-30—National Automotive Parts Assn. Annual Meeting, Drake Hotel, Chicago, Ill.

Dec. 5-7—Long Island Auto Parts Exposition, Long Island Arena, Commack, L.I., N.Y.

Dec. 7-14—Automotive Electric Assn. 44th Annual Meeting and Manufacturers-Distributors Conference, Edgewater Beach Hotel, Chicago, Ill.

Jan. 19-21, 1962—Ohio Automotive Wholesalers Assn. Booster Convention and Booth Show, The Neil House, Columbus, Ohio.

Jan. 25-26—National Forum on Automotive Air Conditioning, Statler-Hilton Hotel, Dallas, Tex.

The advertisement features a globe graphic with latitude and longitude lines. Overlaid on the globe are the following text elements:

- SEE ALL THAT'S NEW IN '62
- FEBRUARY 28 - MARCH 1, 2, 3
- NAVY PIER-CHICAGO
- 1962 I.A.S.I. SHOW
- AUTOMOTIVE SERVICE INDUSTRIES

Motor Age Newsettes

Thinking New In Sixty-Two

The honor of submitting the winning slogan, "Thinking New in Sixty-Two," for the 1962 A.S.I.A. National Convention, has been won by Jack S. Tanner, Vice president and General Manager, Tanner Auto Parts, Inc., Fort Myers, Florida.

"Thinking New In Sixty-Two" has been adopted by A.S.I.A. for

its 1962 Convention and for his winning entry, the Florida wholesaler will be awarded a free round-trip fare for two to attend the A.S.I.A. National Convention in Chicago, Illinois, February 26 and 27. The A.S.I.A. Convention is to be immediately followed by the 1962 International Automotive Service Industries Show, February 28-March 3, inclusive, Navy Pier, Chicago.



Pictured at a General Sales Conference, held recently at the Morris Inn on the campus of the University of Notre Dame, are Field Management Representatives of the Bendix Automotive Service Division.



The influence of Canadian markets on U.S. manufacturers was the subject of one of the principal discussion periods at the Fall Meeting of the Automotive Advertisers Council, held recently at London, Ontario, Canada. "Meeting in Canada for the first time in its 20 year history, the Council came away with a better understanding of U.S. and Canadian mutual problems," said Albert Joseph (seated, center) President of the organization.

New Bendix Division To Serve Automotive Aftermarket

A new division called Bendix Automotive Service has been established by the Bendix Corporation as part of a long-range program to further strengthen and consolidate the aftermarket activities of eight divisions, it was announced by George E. Stoll, executive vice president of the corporation.

Electric Autolite Grants License To Mexican Firm

License to manufacture a complete line of Prestolite automotive batteries was granted by The Electric Autolite Company to Acumulader Insuperable, S.A., according to Electric Autolite International Operations Vice President, J. J. Bohmrich.

The Mexican firm, which has been a licensed manufacturer of Prestolite industrial batteries, will manufacture both automotive and industrial batteries in its Mexico City plant.

In order to acquaint retailers with their new merchandising concept, United Motor Service has held Dealer Fairs throughout the country. Personnel who



assisted at one in Charlotte, N.C. recently, are (left to right) G. C. Fuller, Southern Regional Manager; P. T. Cody, Assistant General Sales Manager; and H. G. Gunlock, Charlotte Zone Manager.

A.S.I.A. Honors More Industry Old-Timers

The Automotive Service Industry Association has presented its DISTINGUISHED SERVICE AWARD to 333 additional member-firms for "exemplary and enduring service" to their communities and to the industry. These are in addition to the 173 com-

panies who have already received the award.

This brings to a current total 506 wholesalers, manufacturers, warehouse distributors, and rebuilders who have been so honored since the Association's program of recognizing "old timer" firms began earlier this year.



Jobbers from 26 states and the District of Columbia attended Bear Manufacturing Company's two-day National Jobber Conference held recently in the Bear Service Garage and School. New machines, such as the No. 162 Power Rack were demonstrated.



Rafael Menchaca, (center left), Chairman of the Board of Directors, Industria Electrica Automotriz, D. F. receives first hand information on the Prestolite automotive alternator from Paul Allmendinger (left) Director of Engineering, Electrical Products Group of the Electric Autolite Company. Looking on (center right) are Roger DeYoung, Chief Engineer Charging Systems, The Electric Autolite Company, and J. J. Bohmrich (right), Vice President, International Operations. The Mexican firm will soon be making Prestolite automotive equipment.

People

Continued from page V

communications become a one-way street—down to the employee, with no "feed back"? . . . Do I take the trouble to explain? . . . Have I become so engrossed in "vital" matters and my own "importance" that I have forgotten the Golden Rule?

I admit those aren't easy questions to answer—honestly. And to slide over that last paragraph is to confirm the suspicions that prompted this entire article. So . . . will you take the time to read those six questions again—slowly?

The most important ingredient in any business is PEOPLE and the most costly part of our overhead, too! Only people make things happen. Make sure they happen the way you want them to.

Machine Shop Operators

Continued from page III

Jobbers who operate shops do not compete with the repair trade but offer those mechanical services most car dealers, repair shop operators, specialists and service stations doing volume work, are not equipped to handle. The repair trade acquires these services from the jobber and resells them at a profit.

Machine shops are operated for two principal reasons:

1. To make a profit that comes from shop labor in combination with the parts involved.

2. To create confidence and good will on the part of the repair trade and thus get a bigger bundle of business, not only in parts and shop labor, but on all merchandise as well.

With thousands of repairmen depending on these wholesalers for technical information and specialized services, these machine shop jobbers are the Master Mechanics of the industry.

Motor Age's **WHO'S WHO**

News of Recent Appointments



Arthur S. Boehm (photo)—to the newly-created position of Sales Manager of the Industrial-Automotive Div. of Black and Decker Manufacturing Co.

* * *

Maurice Ott—as Manager of a newly-created marketing services department for Perfect Circle Corporation.

* * *



Richard J. Klein (photo)—to the newly-created position of Director of Membership Service of Automotive Electric Assn.

Martin W. Thimmel—as Executive Vice President of the Republic Gear Company.

* * *

Stanley E. Hess—as Assistant General Manager of the Wayne Pump Company, a division of the Symington Wayne Corp.

* * *

A. L. McMullen—as Vice President and General Manager of Seiberling Rubber Co. of Canada, Ltd.

* * *



Jack D. Bryan (photo)—as General Manager of the newly-created Speedostat Division of the Perfect Circle Corporation.

* * *

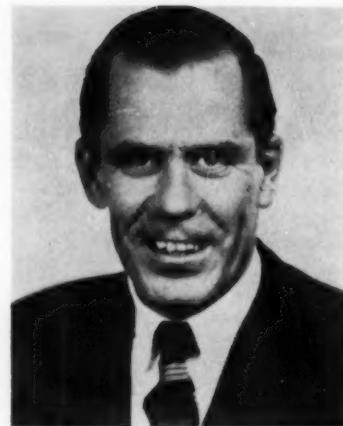
J. Walter Lautenberger—as Chief Engineer of the Malsbury Manufacturing Company.

* * *

Paul F. Russo—as Eastern Division Sales Manager of the Triplex Division of Aluminum Industries, Inc.

* * *

Edward L. Ellickson—as Sales Manager of Electric Service Systems, Inc., a division of Flotronics, Inc.



John L. Fort (photo)—as Sales Manager of the Warehouse Distributor Division of Puro-Filter Products, Inc., Rahway, N.J.

* * *

L. W. Klein—as Manager of Sales Administration, and **William K. Schaefer** as Sales Manager—Briggs Replacement for The Gabriel Company.

* * *

J. Theodore Wolfson—to the newly-created position of Assistant to the Chairman of the Maremont Corporation.

* * *



Edward W. Rogers (photo)—as Brand Manager of the Dow-gard automotive products line for the Dow Chemical Company.

MOTOR AGE Newscoop

Compacts Due to Grow
More On 2-Ply Tires
Below-Cost Sales
Truth-In-Lending Bill

HP Race Not Over-Yet
'62 Chrysler's Big Year?
Rambler's "E" Stick

In the days ahead.... HERE'S WHAT TO LOOK FOR !!!

(Items gathered and edited by Ed Janicki, Bill Montgomery and Neil Regeimbal)

'63 Compacts Due To Grow

WELL, IT WAS BOUND TO HAPPEN.... The three-year cycle is up.... Detroit is now making some new decisions about compact cars, which started to invade market in 1959.... THE COMPACT CARS START GROWING UP IN 1963.

Setting trend will be Dodge Lancer.... It'll be stretched from its current 106.5-inch wheelbase to 111 inches in 1963.... Lengthwise, it'll assume even greater proportions.... And, for first time since it was introduced, Lancer will break relationship with its kin, the Valiant.... Both cars will have completely new and distinct body shells, roof panels, deck lids, and the like.

1962 Falcon and Corvair are now also in their third year.... Neither has undergone any major styling change.... Only minor modifications have been made in past three years.... These were mainly in grillework and exterior mouldings.... Look for surprising changes on these two cars in 1963.

10 Makes Now On 2-Ply Tires

THE 1962 MODELS MARK THE YEAR OF TRANSITION FOR tire industry—the switch from four-ply to two-ply tires.... Ten auto nameplates have now switched completely to two-ply casing as standard equipment.

Significant is fact that Chevrolet has gone "across-the-board" with the two-ply casing, including the Chevy II, only car company to do so.... All Chevrolets, with exception of station wagons and Corvette, are using two-ply tires for 1962.... Compacts which have made the complete switch to two-ply include Falcon, Lancer, Valiant, Comet, Buick Special and Rambler Classic (and the smaller Rambler American).... Pontiac has equipped only a few of its Tempests with two-ply.... The Olds F-85 is the only compact sticking with four-ply casings.

None of the large cars has switched to two-ply.... Larger two-ply tires are now undergoing tests.... But as yet they haven't met all of required standards.

Neil Regeimbal's Washington Almanac

Congress will take a long look next year at two measures designed to change present tire distribution practices or laws. One, passed by the House this year



Neil Regeimbal
*MOTOR AGE's News
Editor, Wash., D.C.*

and pending in the Senate Finance Committee, would equalize the tax burdens faced by independent tire dealers and retail outlets of tire makers. It would impose federal tire and tube taxes at the time the product is delivered to any retail stores or producer outlet. Now, company outlets do not pay the tax until the tire is sold to the consumer.

The other measure, still before the House Commerce Committee, would bar tire makers or petroleum suppliers from retailing tires and tubes in their own stores or stations. The Justice Department opposes the measure, but says it would consider some other answer to the problem.

* * *

State motor fuel tax "taxes" continue to rise. Latest estimates place income from this source in fiscal 1961 at \$4.43 billion. This figure represents the taxes collected by the 50 states, and is \$1 billion (19 per cent) higher than in 1960.

Army Now In Air Pollution Battle

ARMY IS LATEST GOVERNMENT AGENCY to require blow-by devices on all its cars and trucks.... Devices to control crankcase fumes will be standard equipment from now on for all Army vehicles.... Air Force has also been studying devices.... All government civilian vehicles must now have them.... Meanwhile, Public Health Service has provided \$190,000 to Wayne State University College of Medicine (Chicago) to study effects of air pollution on human health, through animal tests.

It Could Be Illegal To Lose Money

FIREWORKS MAY COME EARLY next year over a law to bar below-cost sales.... Rep. Wright Patman, D., Tex., already has such a bill before Congress.... Patman's bill (H.R. 127) would prevent businessmen from selling stocks at "unreasonably low prices".... This would mean at prices lower than inventory or replacement costs plus overhead.... Penalties would include paying treble damages to "injured" competitors.

What About The Bill of Rights?

CONGRESS WILL MAKE A FINAL decision next year on whether to give Justice Department power to seize businessmen's records without special legal action.... Legislation would give Department the same power the Federal Trade Commission now has to take company records for use in civil antitrust cases without a court order.... Measure, sponsored by Sen. Estes Kefauver, D., Tenn., has passed Senate.... Measure will be pending in the House next year.

"Truth-In-Lending" Backers Still Active

BACKERS OF POLITICALLY-HOT "truth-in-lending" bill will make a determined bid next year to win approval of the allegedly consumer measure.... Bill is sponsored by Sen. Paul Douglas, D., Ill., in Senate and by Rep. William Fitts Ryan, D., N.Y., in House.... It would impose rigid rules on consumer credit transactions.... Salesman would have to show on all statements: Basic cash price of an item, credit charge, difference between cash price and time charge, added charges for credit fees, insurance, etc., total amount financed, and interest rate expressed as "simple" annual interest.

HP Race Not Over—Yet

ALTHOUGH HORSEPOWER RACE in industry ended—officially—some years ago, Detroit auto makers are still developing some pretty hot engines.... At least five companies offer special, high performance optional engines for 1962.... More are in the works.

Generally speaking, average horsepower rating for industry as a whole is somewhat lower than on 1961 models.... But several new engines have emerged which will sizzle many pavements.... These include an optional 405 horsepower bomb from Chrysler and a 215 cubic-inch fluid-injection, turbo-charged V-8 job from Oldsmobile.

You Can't Please Everyone

FUNNY BUSINESS THIS AUTO BUSINESS.... For past two years motorists have been complaining about the pesky transmission hump in the front passenger compartment.... Not enough room to seat a third passenger comfortably, they argued.

So this year Detroit auto makers obliged them.... Transmission humps have been reduced considerably as a result of moving engine forward more.... Some have moved the powerplant forward as much as five inches.

But look what happens! Everyone is now offering cars with bucket seats.... These are separated by a console in center.... So now there's no room for a third passenger at all.

Some automen, incidentally, feel that the bucket seats are just a current fad, that will disappear quickly.

With All The Options—Who Needs Models?

WHAT CONSTITUTES AN AUTOMOBILE "MODEL?" There have been some divergent opinions about this.... Result: two people adding up number of models offered for 1962 will come up with two different answers.... Estimates for 1962 have ranged from 325 to 400.

Some maintain that addition of an optional do-flicker automatically makes car a different model.... Some say that if you add a third seat in a two-seat station wagon that vehicle becomes another model.... Others consider it as same model with an option.

Factory conclusions: ignore options and just compare body shells. If they're different, then they're different models.

Ed Janicki's Dealer News

Motor Age recently had a visitor from India. Chap named K. Padmanabhan, who is works manager for one of that country's largest automobile and serv-



Edward Janicki

MOTOR AGE's News
Editor, Detroit

ice equipment distributors. Visiting here on a government-sponsored tour, Padmanabhan expressed fantastic interest in U.S. autos. But he was particularly fascinated by the "speed" with which everything is done—referring to automation, impact wrenches, lubrication equipment and so on.

In India, he pointed out, modern auto and truck repair facilities are few and far between. In most instances, autos are repaired by so-called "street mechanics," who literally sit on the street to repair an auto, since they really have no indoor facilities to do the work. If it rains, a customer simply has to wait until the weather clears up.

Mechanics use very crude tools. Most use one particular tool to perform a number of different operations. The results: stripped bolts and parts that don't fit right. Decent shop tools are as cherished as gems. Mechanics must treat them as tenderly as the most delicate chinaware.

Padmanabhan says that in his shop mechanics have strict orders to clean every tool until it sparkles before quitting time.

'62 Could Be The "Next Year" Chrysler Has Been Waiting For

WITH SOME SPANKING NEW STYLING—particularly in the Dodge and Plymouth lines—Chrysler Corporation, most observers feel, is headed for another "up" year.... Corporation's dealer body is highly enthusiastic about new line of cars.... It firmly believes 1962 is year both company and dealers start making some money.

Since 1950, Chrysler sales have been riding on a constant see-saw.... Traditionally, Chrysler has never had two relatively good years in succession.... Generally speaking, it has been one good year followed by a bad year.... Chrysler's share on the market slumped this year to 13 per cent.. The third worse in past 10 years.... It held 15.1 per cent last year.... One Chrysler executive tells us company needs about 16 per cent of market to "really make money."

Government Restrictions Would Limit Student Employment

PROPOSED NEW RESTRICTIONS on employment of students are raising a storm of protest from businessmen.... U.S. Labor Department, drafting regulations to put new minimum wage-hour law into full effect, has proposed: Limiting provisions permitting sub-minimum pay to full-time students between ages 14 and 18; limiting number of students a firm may hire to the number hired a year ago, but no more than 10 per cent of total work force.... Also limiting employment of students to jobs which they were filling a year ago.... Businessmen say this would restrict student employment, particularly for college students, rather than expand their job opportunities.... Department also proposes to set a minimum for full-time students of 85 cents an hour and 75 cents an hour for vocational school students.

"E-Stick" Could Shift Rambler Sales Into High

A SIGNIFICANT AUTOMOTIVE INNOVATION drew considerable attention this year.... It is American Motors' new automatic-clutch, the "E-Stick," offered on Rambler American.... Opinion is that it will play a big part in helping boost sales of the small, 100-inch wheelbase car.... This car is currently taking 35 per cent of all AMC sales.

If successful, the new clutch will later go into the larger Rambler Classic.... The E-Stick (meaning "ease") provides much of the convenience of a fully-automatic transmission at about one-third of price.... Priced at \$59.50, it should attract buyers who like automatics but who at same time like a little more zip in acceleration which a straight stick provides.

Guaranteed Warranty Program Gains Momentum

THE GUARANTEED WARRANTY PROGRAM, originated in Iowa, continues to spread like wildfire.... Nearly 3100 dealers in 13 states already have program in operation.... Three more states are studying it.... The GW guarantees used car buyer a 15 per cent discount on all repair parts and a 15 per cent cash discount on all labor on warranted used car for one year.

Dealers reportedly are reaping many benefits from program.... Says one dealer: "I've save \$802 on used car policy adjustments in just six months.... This does not take into consideration some savings on used car reconditioning expenses."

FOR THE RECORD



M. C. Patterson has been elected President and Treasurer of the Saginaw Bearing Company and its Beauideal Division. Mr. Patterson was formerly a Chrysler Corporation vice president and general manager of its Dodge Division.

1961 Record Year For Vehicle Safety—Checks

More than 3.5 million vehicles were reported Safety-Checked in the 1961 National Vehicle Safety-Check program. This is the greatest number of vehicles checked in 13 years of reporting results of the safe driving condition of cars and trucks.

In announcing the results of the program, Victor Holt, Jr., Chairman of the Auto Industries Highway Safety Committee, and Executive Vice President, The Goodyear Tire and Rubber Company, said: "Vehicle Safety-Check facilities were provided in 3,448 cities and counties, at military installations, and industrial plants, as well as by government agencies,

and teen-age groups conducting their own Safety-Checks for employees and young drivers."

"The finding of one or more unsafe items for every six cars checked indicates much still needs to be done to make owners aware of the need to maintain their vehicles in safe operating condition at all times," he said.

* * *

Gasoline Tax Increase Causes Lower Consumption

Tax administrators from throughout the United States were told recently that—three times during the 1950's—a Federal gasoline tax increase was followed the next year by coun-



Charles E. Wilson who headed the world's largest auto manufacturing firm, General Motors Corporation for 12 years, and served as Secretary of Defense in the Eisenhower Administration—died on September 26, 1961, at the age of 71.



George H. Love, Chairman of the Executive Committee of the Chrysler Corporation, was elected Chairman of the Board of Directors and the corporation's chief policy officer. Lynn A. Townsend, recently elected President, has been named chief administrative and operating officer of the corporation.

try-wide symptoms of slackening growth in gasoline consumption.

In a speech before the North American Gasoline Tax Conference, Russell H. Venn, a vice president of Humble Oil and Refining Company, stated that 27 states and the District of Columbia showed a lower rate of growth in gasoline demand the year after the 1951 increase than they had shown in the year before it.

An increase in 1956 was followed by a growth decline in 40 states, and the 1959 increase was followed by a growth decline in 39 states.

Further tax increases in gasoline are self-defeating in Mr. Venn's opinion.

REPORT to our READERS



Enterprise Thru Blindness

LEAVE George Do It" is a familiar statement of passing the buck to someone else but for the people of Castle Rock, Colo., it means expert mechanical work—despite the fact that George Pelton has been blind for a quarter of a century.

Although the last model car he has seen was a 1933 Ford V-8, George can do most major over-haul jobs except automatic transmissions.

"One of these days, I'm going to buy one, tear it apart and learn how it works," George confidently has said.

George, a mechanic for 43 years, lost his eyesight in a dynamite explosion while working temporary in a mine during the depression years. The unfortunate accident broke his arm, blew out most of his teeth and left him blind. With unyielding courage he started to learn again how to be a mechanic—this time by touch.

"Since my primary interest was being a mechanic, I knew I had to learn a new way of repairing cars," he stated. "So for \$15 I bought

an old Model A and started tearing it down and putting it back again—and it worked!"

With loss of eyesight, George seems to have developed keener senses of hearing and touch. He instantly recognizes deficiencies in a running motor that may not be audible to a trained mechanic. His sense of touch has become so keen that he can test lights by the amount of heat they radiate—if too weak, to record on his calloused hands, he tests by having the light shine on his face.

In checking electrical shorts he has devised a buzzer which is always in his hip pocket.

His wife, Stella, helps him in the bookkeeping portion of the business as well as reading business letters, statements, papers and the Bible.

With the confidence of a man that has licked all obstacles in his way through life, George's philosophy of business life can possibly be best summed up by a sign he has posted in his garage—it reads: "If we can't make it run—then it must be a snail!"

Faithfully yours,



the MERCURY METEOR

*Ford's new "Canadian Y"
gets an old Canadian name
as the latest member of the
Mercury family*

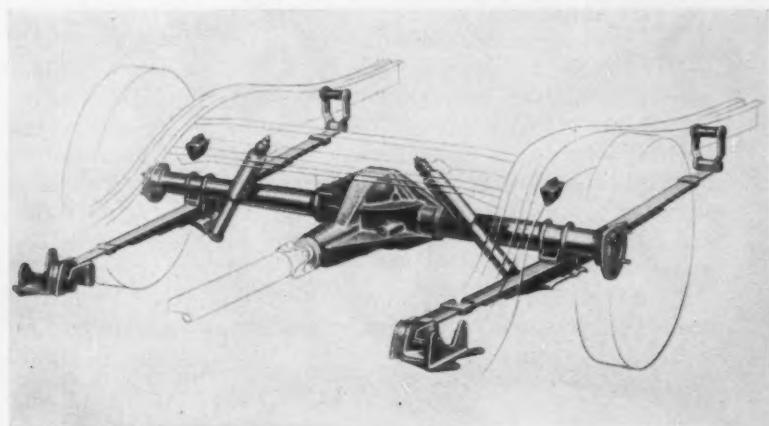
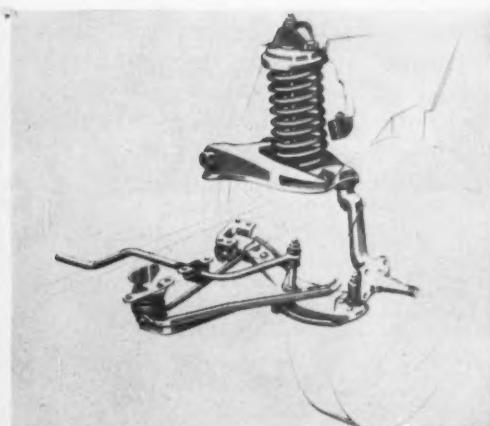
THE Lincoln-Mercury Division of the Ford Motor Company rounds out its line for 1962 with the Meteor, a car that is new in size, styling, and features. It is designed to fill what they describe as a "newly developing segment of the car market." The Mercury Meteor will be built on a 116½ inch wheelbase—2½ inches more than the Comet and 3½ inches less than the full-size Monterey.

The styling theme of the Meteor is as distinctive as the car itself yet it is readily identifiable as a newcomer to the Mercury line for 1962. Built to generous proportions for a family car, the Meteor has extra headroom in both front and rear seats, and ample luggage compartment room.

It is of fully unitized construction with structural members designed as an integral part of the basic body. Its suspension borrows features of the Mercury Monterey

Continued on page 82

Meteor will share Mercury's "Cushion-Link" Suspension—Front and Rear as shown below, left to right.



CHEVROLET'S FIRST



Louis Chevrolet driving
the first Chevrolet built in 1911.

NOVEMBER, 1911 when the first Chevrolet appeared, the industry had built 750,000 automobiles. This is not a big volume by modern standards, but it was big enough in 1911 to prove that four-wheel gas-burners were on the roads to stay. The automobile business, after a wild decade in which scores of new manufacturing enterprises rose and fell, was reaching for stability. The self-starter was at hand.

Closed bodies, another development that made the passenger car a year-round trans-

portation item, were not too far off in the distant future.

What made Chevrolet different from other quick-fading pioneers was the work of two men—a crack race driver and a shrewd financier. The race driver was Louis Chevrolet, whose be-goggled visage was seen racing against Barney Oldfield. The financier was William C. Durant, who twice won and lost control of General Motors.

From all indications Durant had no definite objective when he commissioned Chevrolet



The 1962 Chevrolet Impala Sport Coupe is shown above.



At left is shown Chevrolet's new 1962 sporty Corvette.

to design four and six-cylinder cars in a garage on Grand River Avenue in Detroit. At the time, he had recently lost out at General Motors, but believed that he could produce from scratch a car that could eventually buck the Buick-Olds-Cadillac-Oakland combine.

At the beginning, the financier's confidence in his new venture was so low that he didn't pay much attention to the name of the car. The first four-cylinder models were the "Little," after the company's general manager. The Chevrolet nameplate didn't appear

on the market until the factory was moved to Flint, Mich., in 1913.

For the first three years the Chevrolet record was undistinguished. Output advanced from 2,999 to 5,005 in 1914. However, as 1915 models the company announced a touring car with the title of "Baby Grand" and a "Royal Mail" roadster. These the public liked. Next came the improved, "Model 490." The 1916 volume was 12 times the total of 1914.

While the infant Chevrolet was struggling
Continued on page 104

THE SAFETY BOOM IS ON

*A nationwide safety service boom is underway.
Safety service is a sound basis for success*

By . . . **Carl W. Sachs**
Marketing Manager
Grey-Rock Division
Raybestos-Manhattan, Inc.

MARKET research has convinced us that a nationwide safety service boom is underway, and that the many advantages of a complete brake service product line are overwhelmingly preferred by all levels of sales and distribution. That is why this year—in addition to the quality brake linings which Grey-Rock has always made and sold—we have decided to market a complete line of quality hydraulic brake parts and heavy-duty brake fluid.

A good safety service program, of course, will be concerned with much more than providing only the best brake jobs possible. Every vehicle—and there are some 75 million now registered—represents a market prospect for profitable sales of shock absorbers, lights, horns, windshield wipers, wheel alignment, tires and tubes, and so on. The serviceman, the jobber, the dealer, all know this very well. They know it, yet relatively few have adjusted their business operations accordingly.



In addition, what may easily be lost sight of—under daily business pressures and conflicting promotional blasts from every side—are the many influential forces at work, every day, which help to sell safety service-type products. For example:

Government agencies. State vehicle inspections, in particular, serve as a kind of legislative sales promotion, by virtue of their requiring the repair or replacement of defective parts. Safety campaigns and accident reports that are sponsored or approved by government agencies are another stimulant to automotive safety equipment sales.



Mass communication media. In their best public service tradition, daily newspapers, magazines, radio and television programs have made "Drive Safely" a national byword. They have displayed, freely and frequently, the terrifying human and statistical necessity for both good driving habits and good driving equipment. The Safety-Check Program of the Auto Industry Highway Safety Committee, one of the many fine examples, is conducted and widely reported in several thousand communities each year.

Colleges and high schools. Highway safety and learn-to-drive classes have become increasingly important in today's curricula. Accident prevention studies at Cornell University and other top-flight schools have impressed manufacturers and drivers.

Built-in safety features. Automotive engineers and parts manufacturers have made major contributions, too. Safety glass, safety belts, recessed steering wheel columns, puncture-proof tires, improved door locks; these and many other built-in features are indicative of the safety-first approach that has changed—and will continue to change—the entire automotive industry.

Owners Pre-Sold On Safety

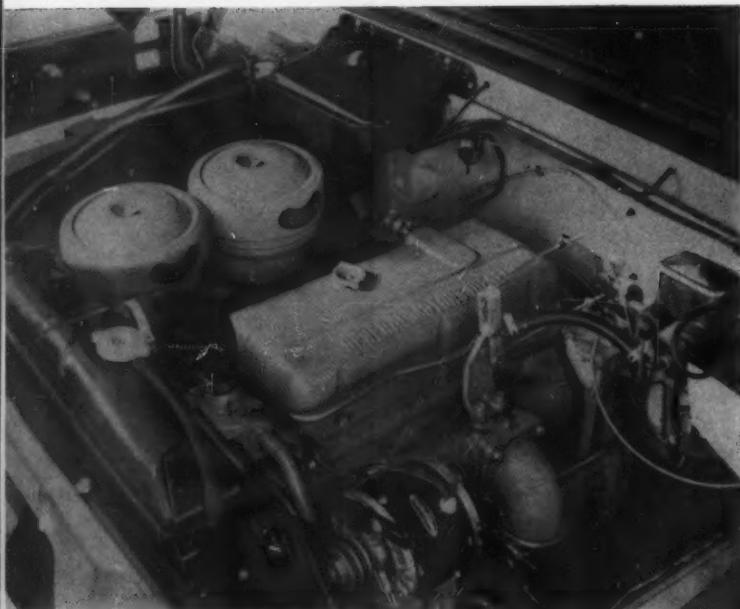
What does it all mean? For one thing, car owners have been pre-sold on safety equipment and good maintenance procedures. For another, today's car owners want safer cars, better service, and fair prices—all of which they have a right to expect.

And what of ourselves? We in the automobile industry

Continued on page 79

the 1962 TRUCK story

MOTOR AGE highlights some of the low-tonnage trucks that will be built and sold in the year to come



Chevrolet's diesel power is supplied by the four-cylinder, 2-cycle, GM "4-53" engine, which is capable of developing 130 hp. and 271 lb. ft. of torque.

A "beefed up" 305 cubic inch V-6 will be standard on GMC's light and medium trucks for 1962. A lower hood line will improve road visibility on all conventional cabs.





A redesigned double side door locking mechanism and an optional forward-folding passenger seat are two of the improvements in Chevrolet's light duty panel truck offered for 1962.

Volkswagen for 1962 offers a special van body which converts a pickup into a closed, weathertight vehicle. The unit provides 165 cubic feet of load space above the bed, and 23 cubic feet underneath.



This special bed for the Volkswagen pickup permits easy loading because of the folding sides and tailgate. Bed measures 74 by 102 inches.



the 1962 TRUCK story

Dodge's P-100 forward-control provides outstanding maneuverability with its 104 inch wheel-base. The Merchandiser body is made by Boyertown Auto Body Works, Boyertown, Pa.



The Falcon Sedan Delivery of Ford's "Business Fleet" is powered by an 85 hp., 144 cubic inch six cylinder engine, offering unusually low cost per transportation mile.



The half-ton, walk-in type "Jeep" Fleetvan is an enlarged, commercial version of the unit that Willys Motors has been producing for Post Office service. It has an 81 inch wheel-base and a payload capacity of 1,000 pounds.



In its light-duty Step Van, Chevrolet offers a city-delivery unit which combines full payload capacity with extreme maneuverability. This forward-control unit's compact wheelbase provides a shorter turning radius than a conventional unit.

This Corvan Panel in Chevrolet's Corvair 95 line, now boasts an automatic choke as standard equipment, and offers a limited slip differential as an option.



GMC's eight-passenger Suburban station wagon offers truck dependability with its passenger-car styling and ride. A V-6 truck engine provides the power.



the 1962 TRUCK story

This 1962 Dodge W-200 Sweptline pickup has a maximum gross vehicle weight of 8,000 lbs. The four wheel drive unit is mounted on a 122 inch wheelbase and is powered by a 225 cubic inch inclined-6 cylinder engine.



Ford's F-100 Styleside pickup offers a three-man cab featuring wide-opening doors. Handle-operated latches make the tailgate easy to open and close.



The light-duty pickup is one of the mainstays of Chevrolets 1962 truck line. The 261 cubic inch six is now being offered as a regular option in this unit.



The big news from Studebaker for 1962 is the introduction of a diesel engine in the 19,500-23,000 G.V.W. range. The low tonnage models, such as this pickup show only minor changes.



The Sweptline pickup body for this Dodge D-100 is available in either 6 $\frac{1}{2}$ foot or 8 foot lengths. A 225 cubic inch six powers the unit, which has a maximum gross vehicle weight of 5,100 lbs.



Ford's F-250 $\frac{3}{4}$ ton four-wheel drive pickup shown at the right also features the "driverized" cab found throughout the cost-reducing "Business Fleet."

DON'T PUSH THE

*12 month—12,000 mile warranties—"lubeless"
cars—infrequent oil changes
Doom—Gloom—or Confusion?*

MANY new influences are at work in the automotive aftermarket today. But few seem to be so surrounded with mystery and misunderstanding as these three: new extended car factory warranties, the advent of the so-called "lubeless" car, and the extended intervals between oil changes.

The prophets of doom say, "Close up your lube department. You're out of business."

The purveyors of gloom say, "Lube business isn't out the window just yet—but wait just a few more months and you'll see the end."

The optimists say, "Don't push the panic button. Lube business is here to stay."

Others are just plain confused. So—who's right?

If you sell ANYTHING off the lift—this is vitally important to you. This is more than a problem just for the manufacturers of lubrication equipment—more than just a matter of concern to a dealer with an investment in a lube department.

It's much more far-reaching than that. Be-

cause basically it effects everyone—manufacturer, jobber, dealer—whose products are sold "from the lift" to any degree. This includes mufflers, fan belts, radiator hose and a myriad of products where up to now the dealer has had the opportunity to spot the need for replacement when the car is on the lift for lubrication.

Lubrication

Chassis lubrication traditionally has been the only service required at regular intervals. It's the one service that has kept the car owner coming back on schedule every month or every thousand miles when the dealer could get his car on the lift.

This meant not only profit from lube business for the dealer—but the profit from the replacement items the dealer could see and sell in his under-the-lift inspection.

Take away this regular monthly business on the lift and everyone's sales are going to feel the effect. Because if the car owner stops only for gasoline—and infrequently for an

PANIC BUTTON

oil change—how is the dealer going to get a look *under* the car?

"Lubeless" Car

The year 1961 was a milestone in the minds of car factory engineers because—for the first time—four models of cars were placed on the market completely free of lubrication fittings. In the strict sense, it would be more proper to call these "fittingless" cars rather than "lubeless" cars because only the fittings were removed, not all the points normally covered in a lubrication job.

The introduction of the "fittingless" car is the culmination of a gradual reduction in the last 8 or 10 years in the number of fittings on automobiles due primarily to design changes. For example, the introduction of ball joint suspension several years ago reduced the average number of fittings per car from about 20 to somewhere in the neighborhood of 10.

On the four new models that were introduced in 1961—with possibly more to come in 1962—the fitting has been replaced with the sealed pre-packed bearing.

Pre-Packed Bearing

The appearance of the new pre-packed bearing is familiar by this time to almost everyone in the automotive business. It is a housing with a special lubricant sealed in. A threaded plug on housing permits replacement or replenishing lubricant after 30,000 miles.

Continued on page 99



"YOU TELL ME YOUR VIEW

Dear Editor:

HAVE been reading your article on Motor Vehicle Inspections for some time and have just completed reading the articles in your September '61 issue.

I just couldn't pass up the article written by someone and signed, "Another Texan." Now, I am not a native Texan as I have only lived here for some 31 years—possibly I'm not as familiar with the laws of this State as I should be. But, for my money, the Motor Vehicle Inspection Law that this State has is one of the best laws that was ever passed by our legislature.

Now I am not saying that it is perfect by

any means. It is not strict enough. But this is not due to the Highway Commission nor the legislature. They did improve on this law at various times with the result that the complainers, such as the one who wrote this article, began complaining and they had to revise them and cut down the requirement concerning passing same.

The aforementioned writer said that it would be better to sell mixed drinks and let



AND I'LL TELL YOU MINE"

Motor Vehicle Inspection has blown up a storm of opinion among some of our readers. It would be worth studying these comments. We could use yours, too

people buy a few and then drive. Why not do away with the liquor entirely and do away with all the hazards of this cause. The mixed drink law was passed with the intention that if you just couldn't stand to go around sober that at least you could go to your home and, in the seclusion thereof, drink to your heart's content. God gave us a mind and we spent considerable time and money to develop same, then some people have to dull it with drink.

The Texas Motto on the road should be changed from, "If You Drive, Don't Drink, and If You Drink, Don't Drive," to "Think, Don't Drink, and Don't Drink, Think."

I have operated a Motor Vehicle Inspection Station since 1951, the year the law was passed. I have heard the various gripes and complaints concerning it. But the records have proved and will bear out that it has cut down the death rate on the highways and the life that it saved might have been mine. So, I say, let's do the best we possibly can with the laws that we have and obey them—possibly in the future we can get better and more strict laws passed.

Possibly in the future we can bear influence on our legislature to pass a law making it a law that if found driving a car with even "one for the road" smelling from your breath, the penalty would be severe enough to cause a person to THINK.

*Earl Robins,
Odessa, Texas*

Dear Editor:

CONCERNING your recent article on Motor Vehicle Inspection, I am for it. I just don't think it's strict enough. I have been a pilot since 1949 and I know the value of a proper inspection. I wouldn't think of flying an airplane that didn't have a current inspection and even then I always, at least, walk around it and look it over and check the engines out before every flight.

If people who drive were as thorough about maintenance or, at least, look at the car before they drive it, there wouldn't be nearly as many accidents. But they won't be bothered to take the time to save a life. Therefore, the State has to make them check the car once a year.

The State should make the driver take a complete driving test once a year and since insurance is compulsory it should be required that insurance, a valid driver's license and a proper inspection are all current before new

Continued on page 128

Recollections

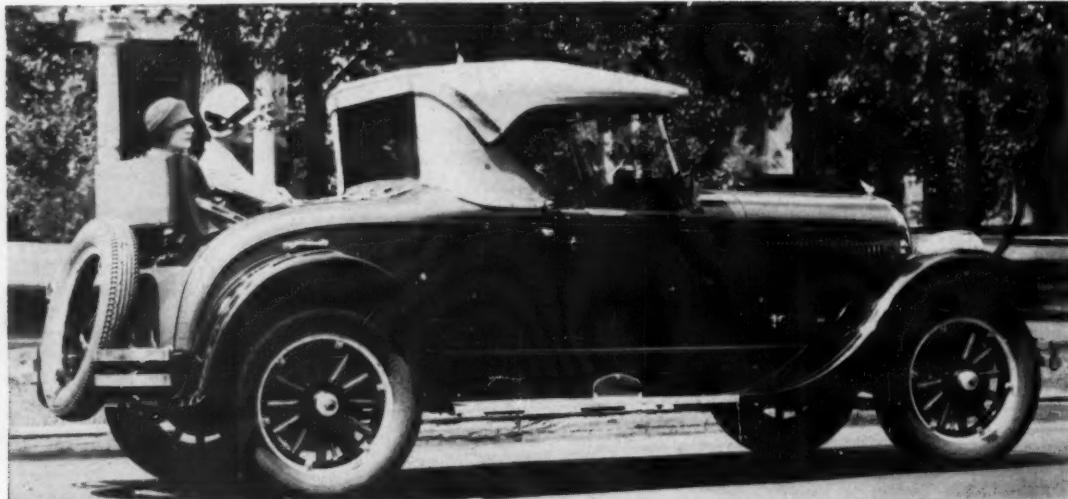


What Happened To The Good Old Rumble Seat?

REMEMBER the rumble seat? It had its heyday in the 1920's and 1930's, then went into oblivion shortly before World War II. At the peak of its popularity the rumble seat ("mother-in-law" seat, the gangsters called it) was available on two-door roadsters and coupes, and the highways teemed with rumble seat models. Today's convertible is its nearest relative.

Recall the cabriolet, a type of touring car with folding top and glass windows which could be rolled down? The hardtop replaced that model, too.

1927 model "70" Chrysler Roadster.



What about the broughams and phaetons? One was a closed type, replaced by the club sedan; the other was an open car, with the convertible as its closest kin among today's body styles.

And what ever happened to the three-passenger business coupe? It survived considerably longer than the rumble seat roadsters and coupes, but it, too, went into decline, and today it is rarely found in new car salesrooms.

Body styles have changed, but many of
Continued on page 114

MOTOR AGE

TECHNICAL
TRAINING



THE MOTOR AGE has been publishing news about the motor industry since 1907. It is the official publication of the American Society of Automotive Engineers. The Society's members are engaged in the development of new and improved methods of design, manufacture, and operation of motor vehicles.

The Society's members are engaged in the development of new and improved methods of design, manufacture, and operation of motor vehicles. The Society's members are engaged in the development of new and improved methods of design, manufacture, and operation of motor vehicles.

Typical cross-section of the in-line, side valve, "L" head internal combustion, Otto four-stroke cycle engine.



Part 1

THE

INTERNAL

COMBUSTION

ENGINE

Archimedes once said, "Give me a lever and I will move the world." The Internal Combustion Engine using some of his basic principles is doing just that

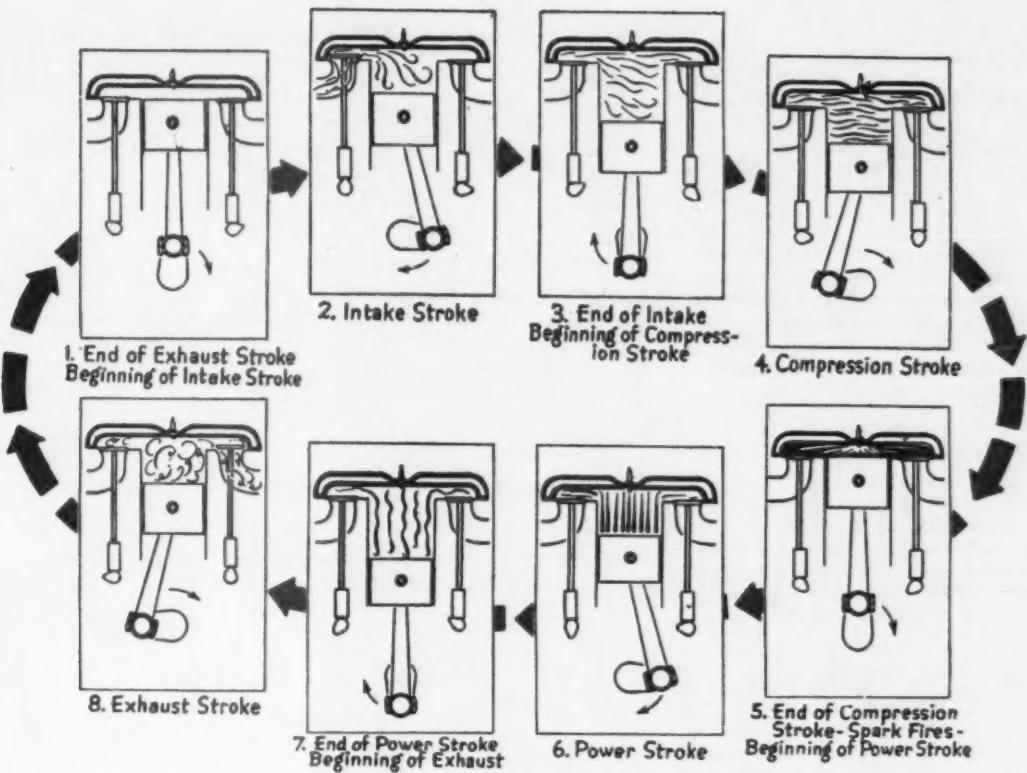
THE automobile in America has caused a revolution in the way we live. It has given us a means of transportation with excellent highways unequaled in any other country. Nearly three out of four families now own automobiles. As for its effect on our economy, one out of every seven wage-earners is connected with the Automotive industry. All of this started way back in 1893.

Using the designs of Charles E. Duryea, his brother, J. Frank Duryea built a single-cylinder horseless carriage which he operated in Springfield, Mass., on September 21, 1893. It was the first successful gasoline engine pro-

pelled motor vehicle made in America. It incorporated for the first time in any American-made car, electric ignition and spray carburetor, both of which J. Frank Duryea designed and built. This was 17 years after Dr. N. A. Otto developed the four-stroke cycle internal combustion engine which to this day still bears his name. It was the development of this four-stroke cycle principle by Dr. Otto that really gave the automobile its real push into the future.

Otto And Diesel

Basically there are two types of reciprocating



The series of events in the four-stroke cycle Otto or Diesel engine. In the Otto cycle ignition occurs when the spark plug fires; in the Diesel engine ignition occurs when fuel is injected into the hot air.

ing engines (pistons that move back and forth). The external combustion type represented by the steam engine and the internal combustion type represented by the gasoline and the Diesel engine. In all cases they are heat engines, their power is generated by heat. The steam engine burns fuel in an outside container and this heat changes water to steam which is transmitted to the working cylinder. In the internal combustion engine, the fuel is burnt and consumed within the working cylinder.

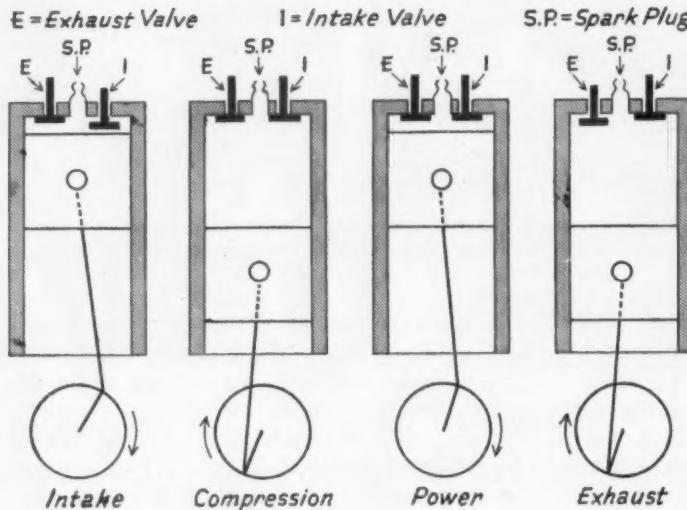
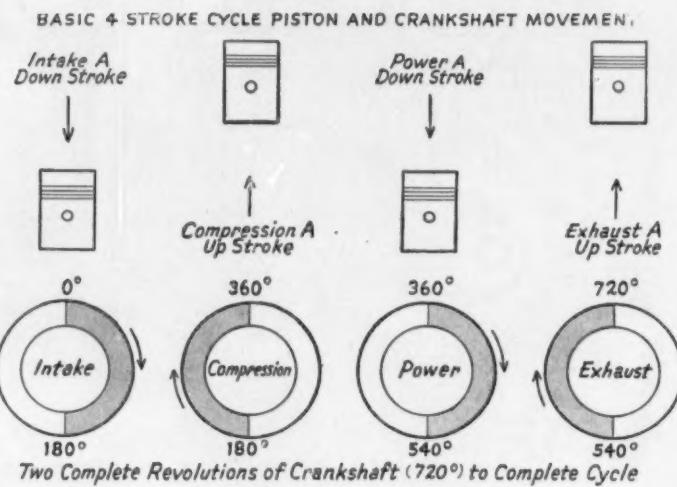
In this lesson we are mainly interested in the reciprocating internal combustion engine. These are divided into two types; the four stroke cycle and the two stroke cycle. By this we mean the number of strokes it takes a piston to complete the full cycle of combustion. In the four stroke cycle engine it would take four strokes, two up and two down strokes to complete the series of events required to complete the cycle of combustion. These strokes are: first; the intake in which

the piston moves down the cylinder. As the piston moves down the cylinder, a correctly proportioned mixture of fuel and air is admitted to the cylinder by way of an open intake valve. Normally, each cylinder has an intake and exhaust valve. These valves are timed to open and to close in proper relation with piston position. When the piston reaches BDC, (bottom dead center) the intake valve starts to close and the piston begins its return trip up the cylinder. After the piston has traveled several thousandths of an inch in its upper movement the intake valve closes. This is the beginning of the compression stroke. The piston moving upward in the cylinder will compress the trapped air and fuel mixture until it reaches a pressure of approximately 180 pounds per square inch. At a point several degrees before the piston reaches TDC (top dead center) an electric spark ignites the air and fuel mixture. This mixture in burning, starts to expand and

Continued on next page

The Internal Combustion Engine 1

The basic four-stroke cycle engine requires 720 degrees of crankshaft rotation to complete the series of events leading to power development. Each piston makes two up strokes and two down strokes during this cycle.



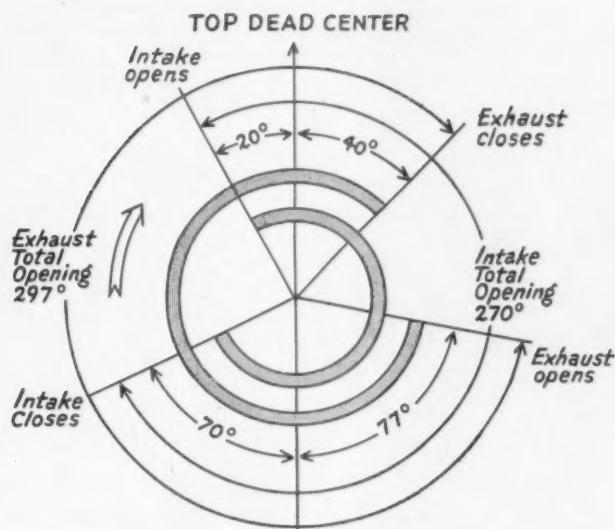
Valve opening and closing is controlled by a camshaft driven by the crankshaft. The camshaft turns at one half the crankshaft speed.

build up pressure which can reach as much as 800 pounds per square inch. The combustion temperature can at full load, reach 4000 F. degrees at the exhaust valve. As a result, exhaust valves in an engine under full load will glow cherry red and still not fail because of the great advances made in valve metal research.

Scavenging Stroke

As the piston moves on over top dead center the burning fuel mixture that was ignited by the electric spark will have reached its maximum pressure which then forces the

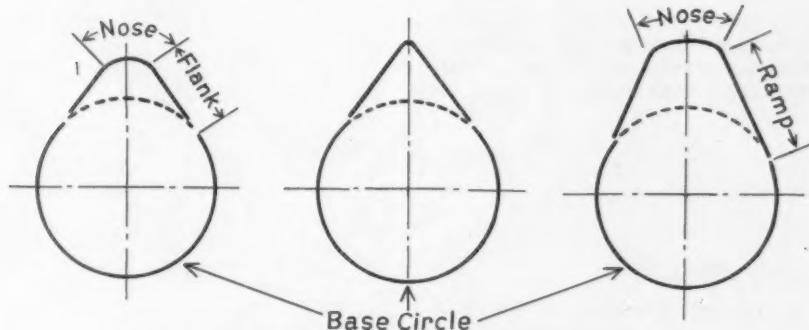
piston downward in the cylinder for the third stroke called the power stroke. Shortly before the piston reaches the bottom of its travel the exhaust valve opens and the burnt gases expand out into the exhaust manifold at a pressure above atmospheric. This is done to give the gas a velocity (speed) in leaving the cylinder. The piston now begins its final stroke in moving upwards in the cylinder. This stroke is called the exhaust or scavenging (cleaning-out) stroke. The piston acts as a positive displacement pump and forces the remaining exhaust gases out of the cylinder through the open exhaust valve.



*Example of Valve Timing Diagram
for a 4 stroke cycle Engine*

To fully understand the Valve Timing Diagram; keep in mind that the compression and power phase of the cycle are not shown in the diagram; only the valve sequence is shown. Notice the period that both Intake and Exhaust valves are "lapped" open.

The design of the cams on the camshaft control the opening and closing of the valves. The variations on the flank and nose of each cam is of prime importance in obtaining the desired efficiency from any engine. Each engine uses a cam design that best suits its characteristics.



*Various Types of Cam Contours
Used on 4 Cycle Engines*

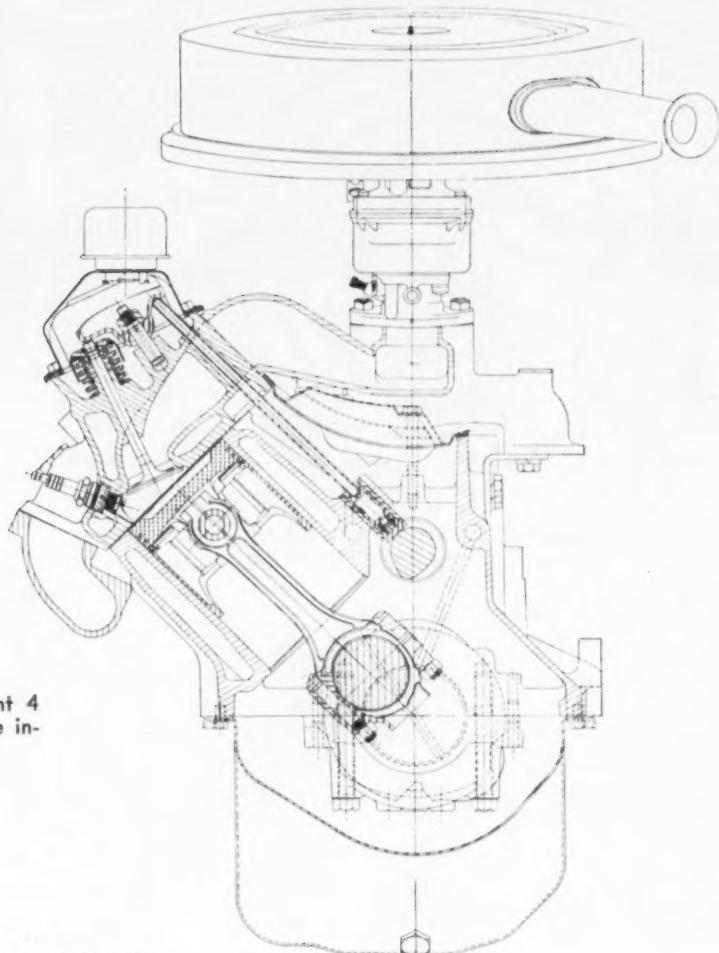
On modern day engines they use a term "Valve Lap," this occurs at the end of the exhaust and the beginning of the intake stroke of the piston. It is the period in valve operation where both the intake and exhaust valves are open at the same time. This is done to take advantage of the inertia of the outgoing exhaust gases in helping to clean out the clearance volume (space remaining in combustion chamber after piston reaches top dead center-TDC). The velocity of the outgoing exhaust gases create a slight vacuum in the clearance space volume as they pass through the exhaust valve and port on their

way through the engine's exhaust manifold.

By keeping the exhaust valve open after TDC and opening the intake valve say, eight degrees before TDC, the slight vacuum created, causes the incoming fuel mixture to start flowing into the combustion chamber well ahead of the downward or suction stroke of the piston. This gives the engine a greater fuel air mixture charge than would be possible by arranging the valves to open or close at the theoretical TDC point. This is called "increasing the Volumetric Efficiency" of the engine.

Continued on next page

The Internal Combustion Engine1



View of the Pontiac Tempest Slant 4 cylinder overhead valve Otto cycle internal combustion engine.

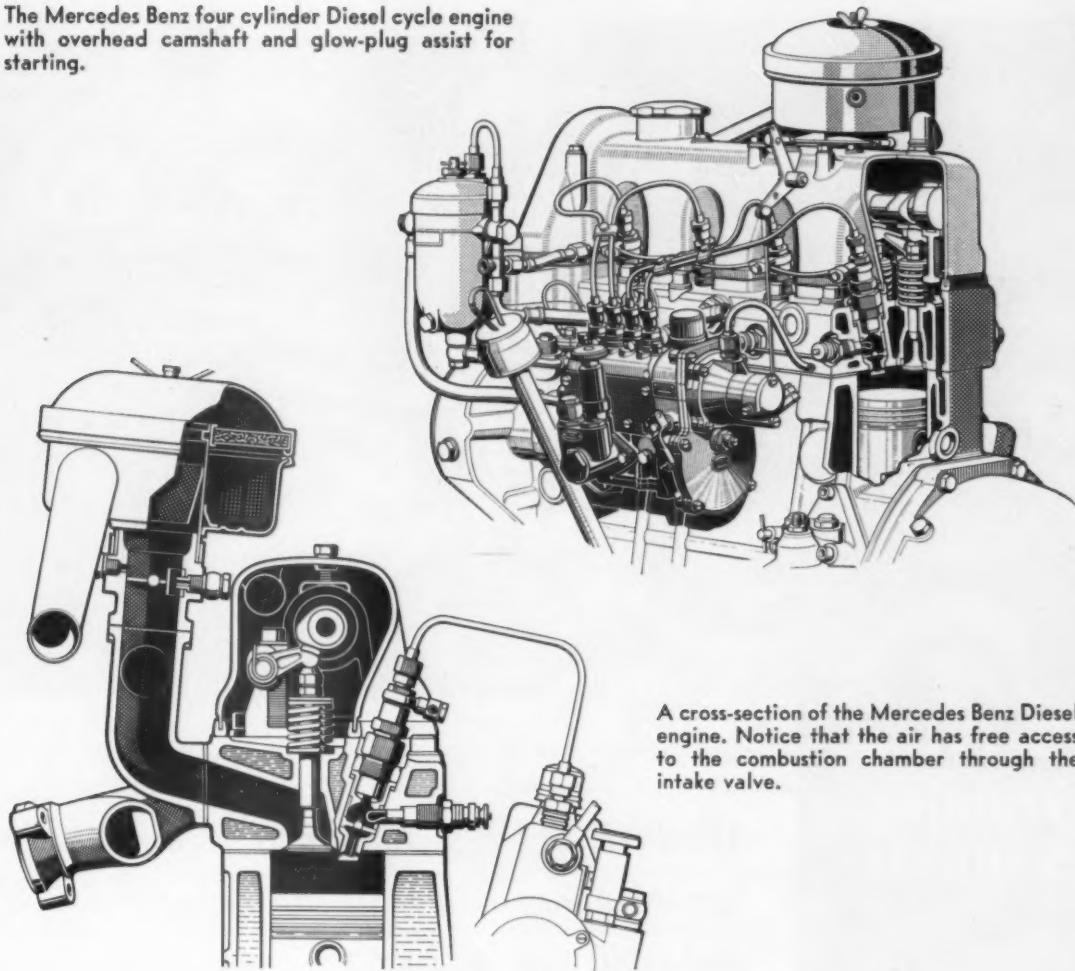
Engine Efficiency

Volumetric efficiency is the ratio of the air and fuel mixture that an engine cylinder can hold as compared with the volume that actually enters the cylinder while engine operates. Such things as carburetor throttle valve and shaft restriction, friction losses of the gas mixture in passing through the intake manifold, inlet port and valve and turbulence flow losses in the combustion chamber; all help decrease the amount of mixture entering the cylinder at running speed. On average speed engines, this valve lap would be about 18 degrees; that is, the intake would open 8 degrees BTDC and the exhaust valve would close 10 degrees ATDC (after top dead center). On high-speed engines, the average intake might open 15 degrees BTDC and the exhaust valve would close at 15 degrees ATDC. This would give a period of 30 degrees of piston and crankshaft travel where both

the intake and exhaust valves were open at the same time, called "valve lap." Engines used for racing have such high valve lap that it is almost impossible to idle them smoothly if they can idle at all. The idle problem is gladly sacrificed in order to gain the advantage of better volumetric efficiency.

During the intake or down stroke of the piston the cylinder is recharged with the combustible air and fuel mixture. This continues after the piston has reached the bottom of its stroke and then starts up on the compression stroke. The intake valve may stay open for about 38 degrees ABDC (after bottom dead center) to allow the incoming mixture to take advantage of its inertia or velocity

The Mercedes Benz four cylinder Diesel cycle engine with overhead camshaft and glow-plug assist for starting.



A cross-section of the Mercedes Benz Diesel engine. Notice that the air has free access to the combustion chamber through the intake valve.

and compact itself against the upward moving piston head for a greater intake charge. The 38 degree mark has been found by engineers to be the point in piston travel where the piston will then start the gases on their compression phase. The 38 degree mark would only hold for one type of engine. Each engine would have a point in its compression cycle where the intake valve would have to close or lose its effectiveness. This point would vary on any given engine depending on many factors in its design and performance requirements.

The cycle of events are repeated over and over again in the Otto Cycle internal combustion engine. Intake, compression, power then

exhaust; intake, compression, power then exhaust and on and on.

Combustion Process

So much for the physical cycle of the four-stroke Otto Cycle internal combustion engine. For clarification, the four-stroke cycle principle is also applied when discussing the Diesel engine. You've heard the term many times we're sure; "Four-stroke cycle Diesel Engine." Now, if we have a four-stroke Otto cycle internal combustion engine and a four-stroke Diesel cycle internal combustion engine, they are either the same or they are different. Actually, they are the same as far

Continued on page 90

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General Motors Corp. Truck & Coach Division offers instruction in the approved overhaul, maintenance and diagnosis procedures. It is available free of charge to all service personnel sponsored by a GMC Truck Dealer, or a GMC fleet operator. The following courses are offered:

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Continued on page 126

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MOTOR AGE Mechanics Training Course

NAME _____ DATE _____
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INTERNAL COMBUSTION ENGINES

Test V

Indicate your response to the correct answer by making a firm "X" or "✓" in the block provided.

- CUT OUT PAGE ALONG THIS LINE—SEE OTHER SIDE FOR INSTRUCTIONS
1. The four stroke cycle gasoline engine was developed by:
 a. J. Frank Duryea b. Charles E. Duryea c. Dr. Rudolph Diesel
 d. Dr. N. A. Otto
 2. The reciprocating internal combustion engine is divided into two basic types:
 a. Rotary and vertical b. Six and eight cylinder c. Four and two stroke cycle
 d. Internal and external combustion
 3. The power stroke of the internal combustion engine is a:
 a. Down stroke b. Up stroke c. Low stroke d. Medium stroke
 4. In the four stroke cycle engine the intake valve closes generally at:
 a. 8 degrees BBDC b. Several degrees ABDC c. At TDC d. At BDC
 5. What is another name applied to the exhaust stroke of an engine?
 a. Smoke stroke b. Scavenging stroke c. Fire stroke d. Pump stroke
 6. The period in valve operation where both intake and exhaust are open together is called:
 a. Twin period b. Timing period c. Valve opening d. Valve lap
 7. Better engine Volumetric Efficiency is achieved by accurate control of:
 a. Spark timing b. Valve lap c. Engine speed d. Carburetor adjustment
 8. The Otto Cycle engine operates on a process of combustion known as:
 a. Constant volume b. Constant pressure c. Heat conversion
 d. Thermal efficiency
 9. The Maximum compression ratio satisfactorily used in the Otto engine is:
 a. 12 to 1 b. 5 to 1 c. 20 to 1 d. 16 to 1
 10. The space remaining in the combustion chamber after the piston is at TDC is called:
 a. Void space b. Total volume space c. Clearance volume space
 d. Vacuum space

* *Comments to the Editors:*

MAILING INSTRUCTIONS

Answer the questions. Cut out and fold firmly along dotted lines and return promptly to the Editors of MOTOR AGE, postage free. It is not necessary to tape or seal envelope after folding.

Test will be graded and notification of your score will be mailed to you. Upon completion of entire mechanic training course, you will be awarded the MOTOR AGE Certificate of Completion.

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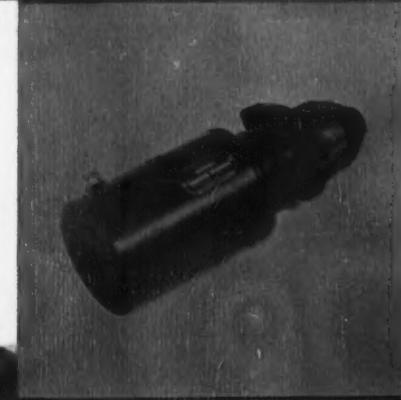
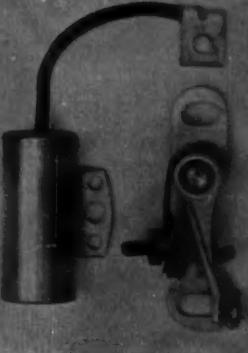
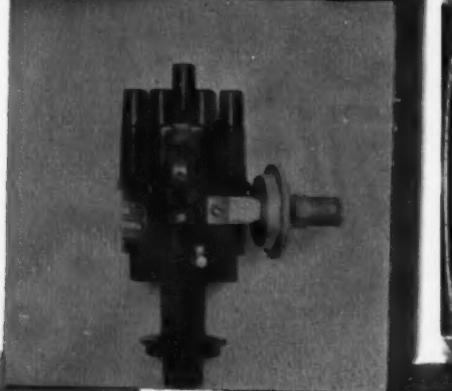
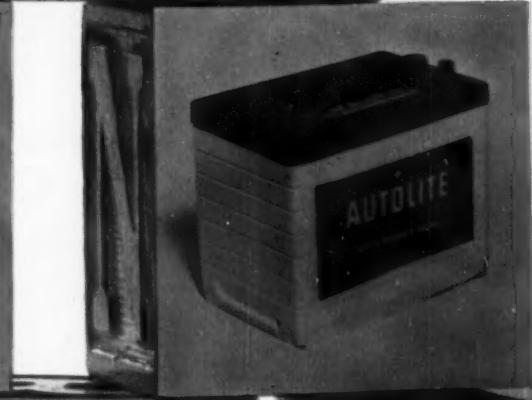
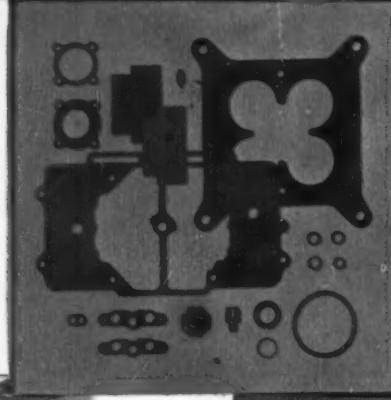
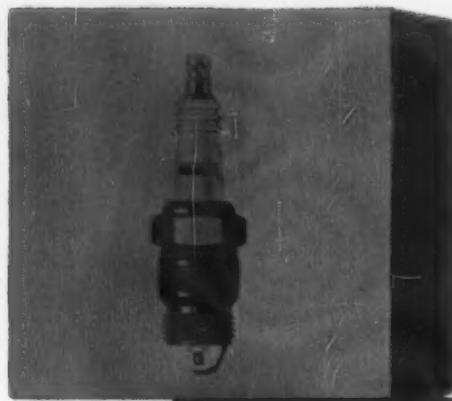
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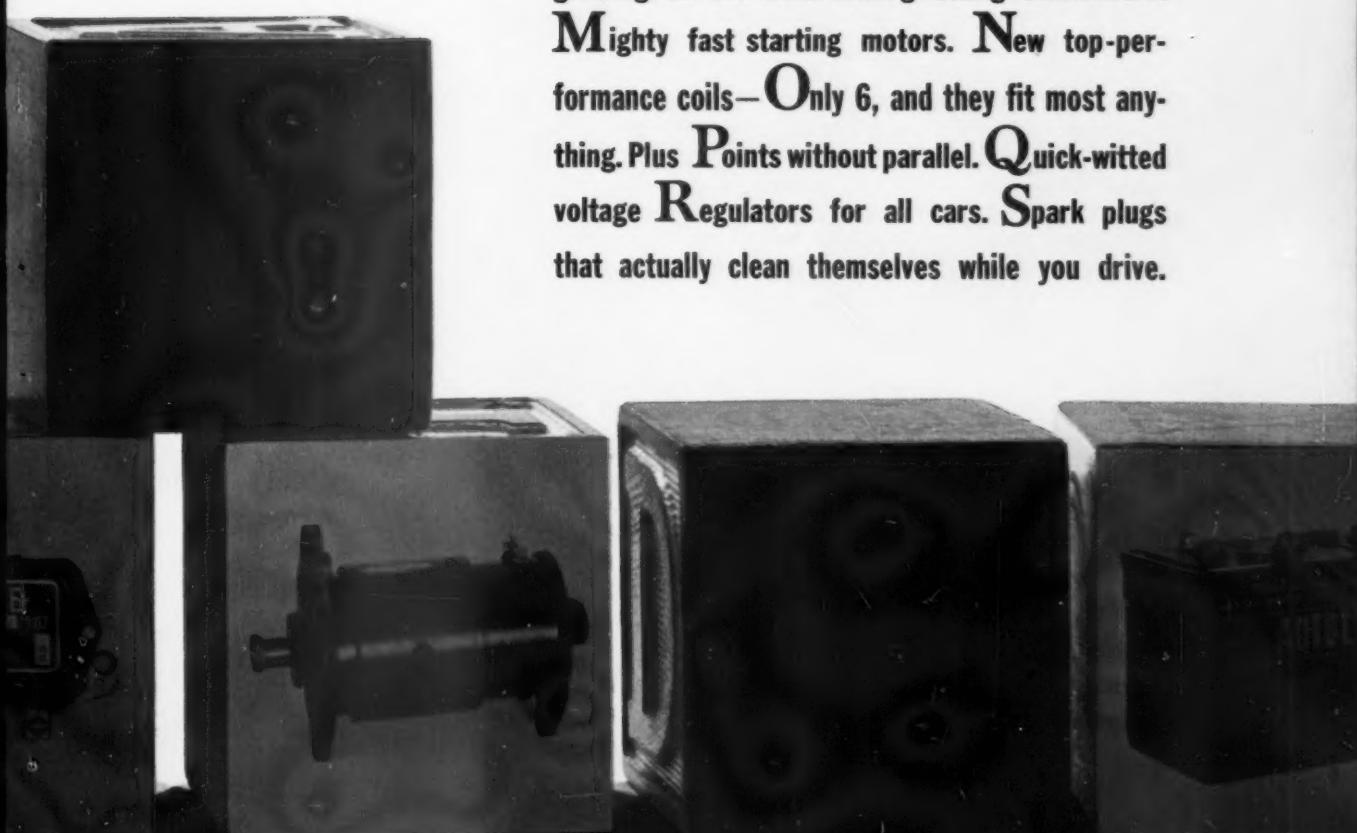
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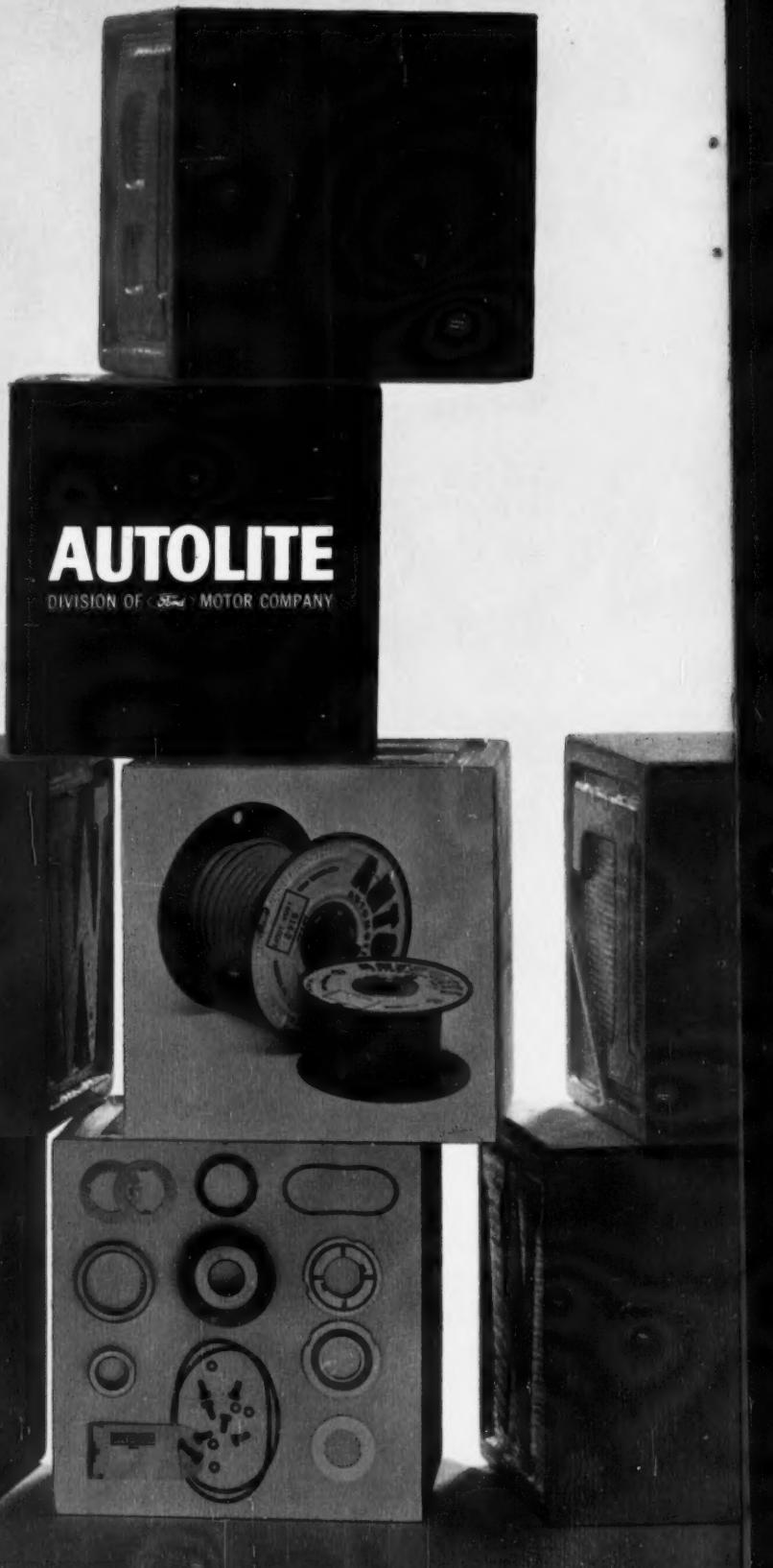


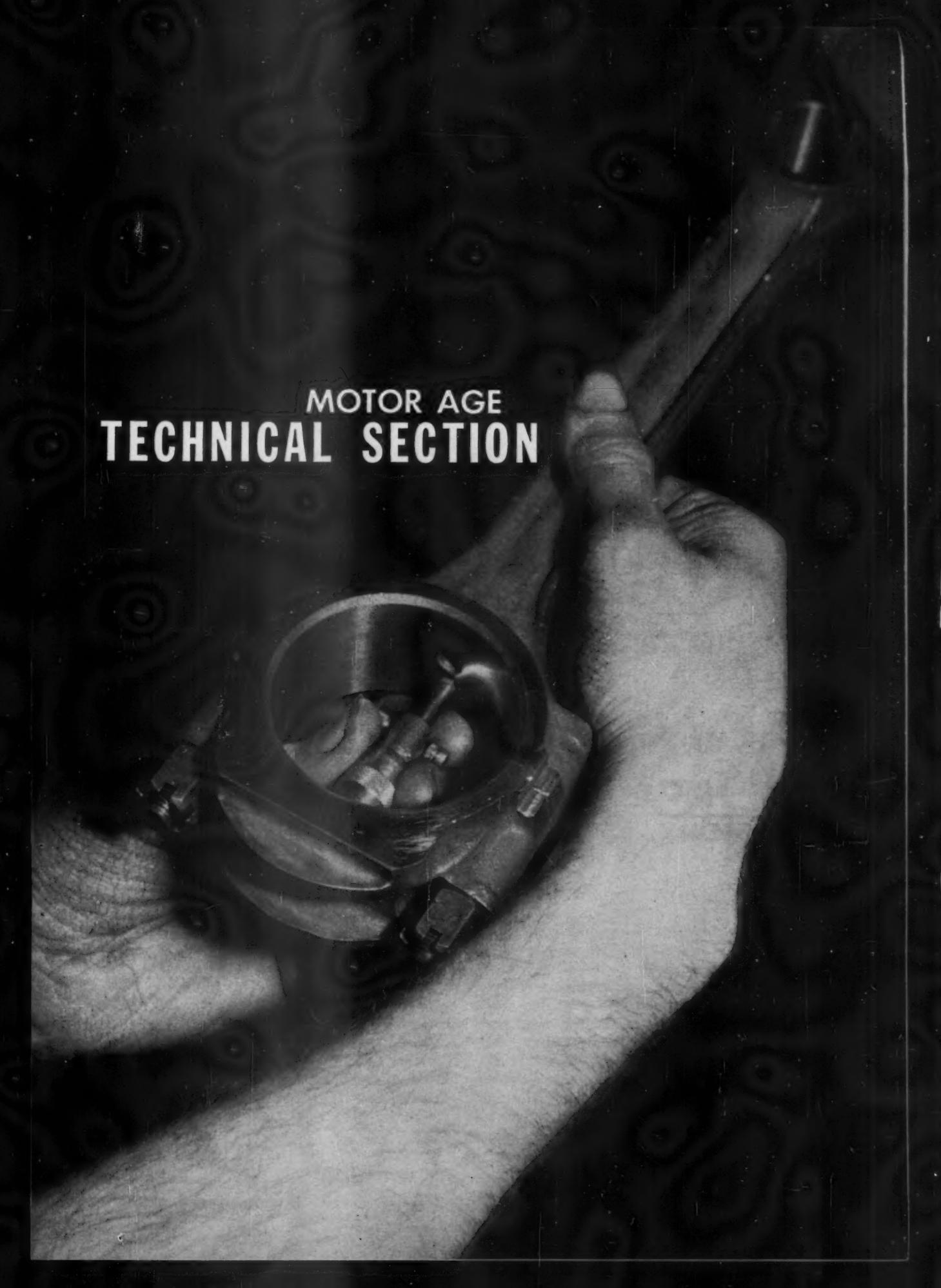
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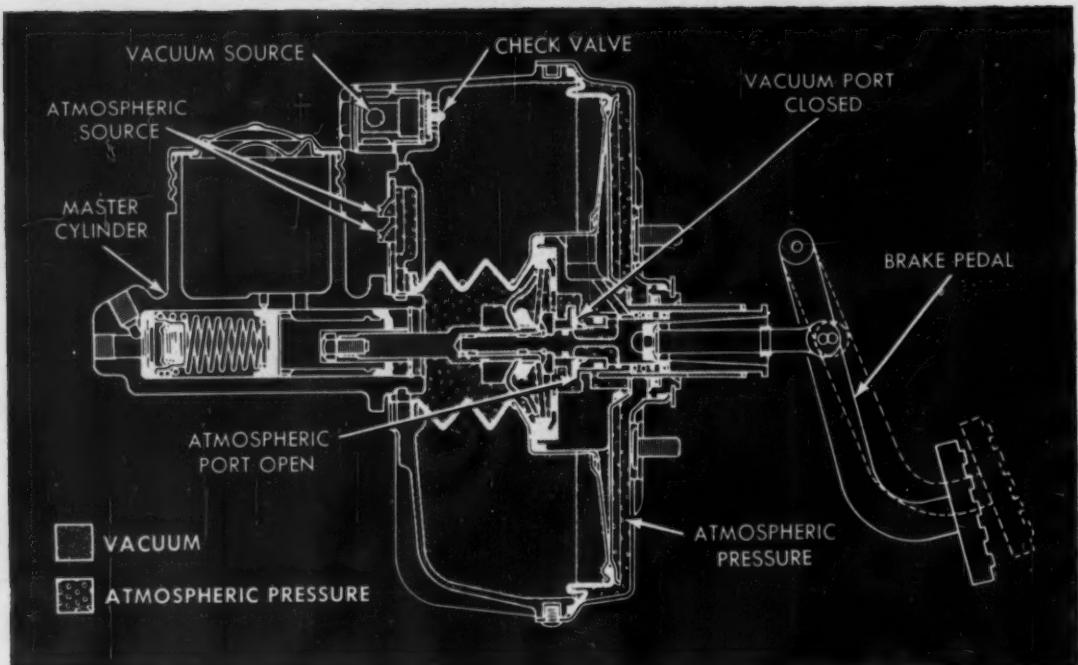
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MOTOR AGE
TECHNICAL SECTION

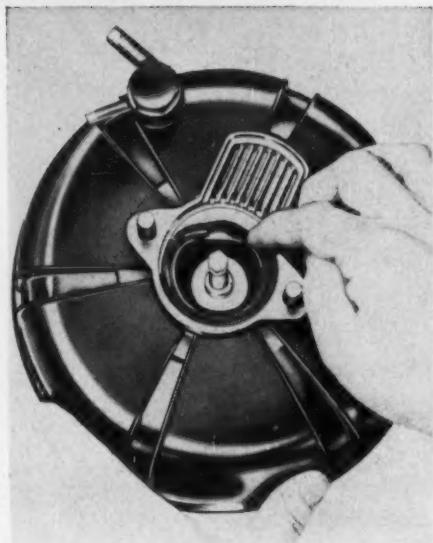


Above: Cutaway of the Booster in the released position.

Right: Removing bellows, control valve, and dia-phragm assemblies.

Servicing the Midland Ross Power Brake

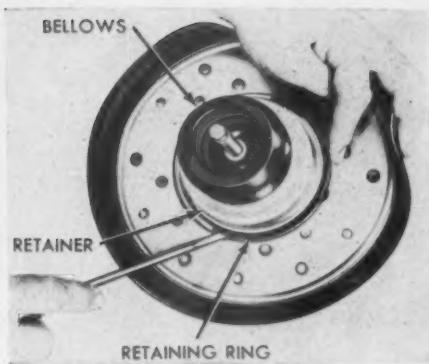
This popular power brake unit is being used on Ford Products



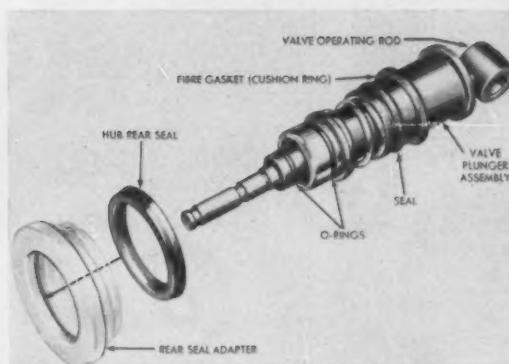
By John K. Montgomery, Technical Editor

SHOULD the booster assembly need repairs, proceed as follows: External parts removal. Remove the air filter and hub and the filter from the booster body. Remove the vacuum manifold mounting bolt, manifold, gaskets and vacuum check

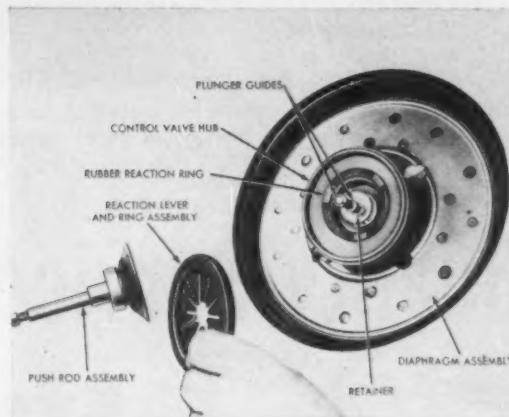
valve from the booster body. Disconnect the valve operating rod from the lever. Remove the lever from the booster end plate brackets. Remove the two brackets from the end plate. Remove the rubber boot from the valve operating rod.



Top: Prying out the bellows retaining ring.

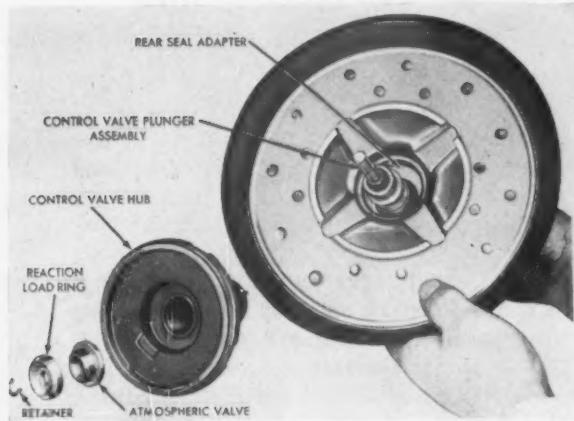


Right: Exploded view of the push rod, reaction lever and ring and rubber reaction ring.



Upper Right: Sequence for assembling the valve operating rod, plunger and rear seal.

Below: Exploded view for removal or installation of control valve hub.



To remove the bellows, control valve, and diaphragm assemblies, take out the large "C" ring that retains the rear seal adaptor assembly on the booster end plate. Scribe matching alignment lines on the booster body and the end plate. Then remove the retaining

screws and tap the outside of the plate with a soft hammer to separate the plate from the booster body. Push the bellows assembly into the vacuum chamber and remove the bellows, control valve and diaphragm arm as an assembly from the booster body. Remove the outer "O" ring from the control valve hub.

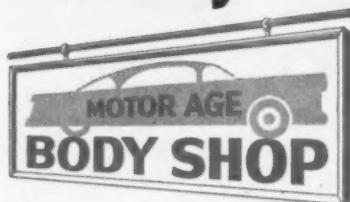
To disassemble the bellows, push rod and control valve assemblies. Remove the large bellows retaining ring bellows, bellows retainer and support ring from the diaphragm and valve assembly. Remove the retainer and support ring from the bellows. Remove the push rod assembly, the reaction lever and ring assembly, and the rubber reaction ring from the control valve hub. Remove the reaction cone and cushion ring from the push rod assembly and disassemble the reaction liners from the ring. Remove the two plastic

Continued on page 114



Ten years ago the corner where the successful Jungle Auto Clinic now stands was just a snake-infested jungle. The station has grown rapidly and now boasts a new showroom.

Quality Service Pays off— Even in the Jungle



*This Florida repair shop
pyramids successful
operation with a fair shake
and complete service*

FLORIDA is popularly conceived as a state where pleasure-seeking, sun-worshipping, bikini-clad charmers adorn the beaches. But turn the kaleidoscope a bit and a different picture emerges of resort cities like St. Petersburg, mecca for retirees from across the nation. That's where Ed Gignac conducts his Jungle Auto Clinic and Service Station.

"These 'senior citizens,'" says Ed, "live on fixed incomes. Because of rising costs and the shrinking value of their meager dollars, the oldsters who comprise most of our customers are keen shoppers. They are both price and quality conscious. But give them a fair shake, supply a one-stop service and you insure their continuing loyalty."

Ed started his station ten years ago when the area was a jungle of snake-infested palmetto land and he ran a one-man shop. Today he employs seven men. Each average from \$6,000 to \$7,000 a year in take-home pay. Aside from the people who moved or passed away, Gignac still retains most of his original clientele.

Ed is averse to overlooking any plan that is successfully showing up in the profit columns of other stations. He soon learned that the average motorist is irked if he can't have

Continued on page 127



With 30 years' automotive experience behind him, Ed credits hot paint as a partial reason for his quality paint work.



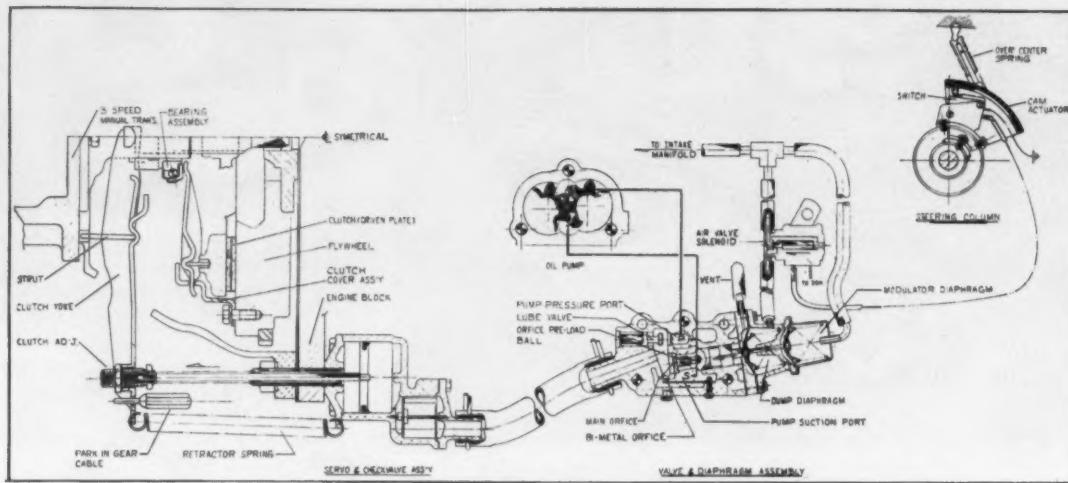
Whether the job be a transmission chore or wheel alignment work, Ed charges enough to warrant doing a thorough and highly skilled job.

◀ Gignac makes it a point to render the diagnosis as well as personally checking out each job. "Saves call-backs and disgruntled customers," he says.

This buyer of a used car came to Gignac for needed repairs. He now shops the station regularly.



◀ A variety of good tools is promotional material since they inspire confidence and remind customers of needed repairs. This job resulted from a suggestion made during one of the dollar lube jobs.



Above diagram shows the system used to achieve automatic clutch operation on the American Motors "E" Stick transmission. Sketch shows unit at idle speed and in gear.

"E" Stands for Easy

This unique clutch is oil applied and spring released

By Terrence J. McCabe, Feature Editor

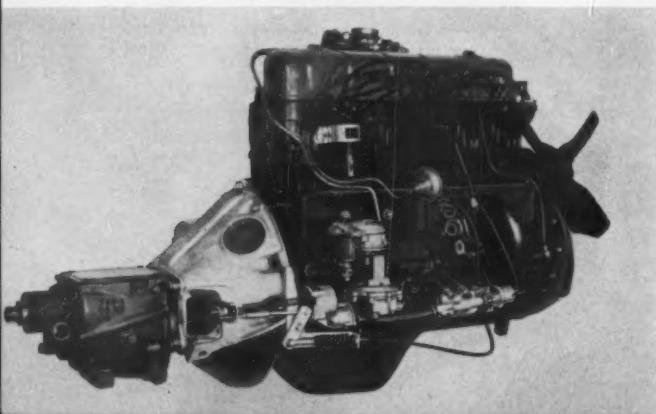
AMERICAN Motors offer the "E-Stick" shift control in conjunction with a standard manual shift transmission with or without optional overdrive on the American models. The E-Stick drive employs a unique version of the conventional clutch without clutch pedal. This arrangement provides a good approach to the convenience of

an automatic drive, coupled with the economy of manual transmission.

The clutch assembly employed with the E-Stick drive has a conventional disc driven plate and springless pressure plate. However, unlike the conventional clutch it's always in the released position and must be actuated for engagement. You may recall the vacuum type of clutch used before the second World War, used a clutch pedal for disengagement when starting the engine. The E-Stick clutch is in the released position when the engine is off or when idling. You will note from our illustration that the clutch pressure plate isn't equipped with pressure springs or centrifugal weights for applying pressure to the driven disc. The clutch pressure plate is simpler and much thinner than a conventional clutch pressure plate assembly. It bolts to the engine

Continued from page 124

Below is the oil supply and power unit as installed on the American Motors engine.



1962 Tune Up—Alignment Specifications

MAKE AND MODEL	No. of Cylinders, Bore and Stroke (In.)	Max. Brake Horsepower	Spark Plug Make and Size (In.)	ENGINE		TUNE-UP DATA						FRONT END ALIGNMENT			
				Seat Angle	Tappet Operating Clearance	VALVES			IGNITION			Steering Axis Inclination (Deg.)	Caster (Deg.)	Camber (Deg.)	
						Inlet (Deg.)	Exhaust (Deg.)	Inlet (In.)	Exhaust (In.)	Breaker Point Gap (In.)	Cam Angle (Deg.)				
						Exhaust (In.)	Exhaust (In.)	Exhaust (In.)	Exhaust (In.)	Breaker Point Gap (In.)	Cam Angle (Deg.)				
AMERICAN MOTORS CORP.															
Rambler... American (Deluxe & Custom)	6-3 1/2 x 4 1/4	80	Ch-14	45	45	.018C	.018C	.020	.39	.035	38	8	1/4N to 1/4P	1/4N to 1/4P	1/8 to 1/8
...American 400 (Std. Eng.); Deluxe & Custom (Eng. Opt.)	6-3 1/2 x 4 1/4	125	Ch-14	45	45	.012H	.016H	.016	.32	.035	88	8	1/4N to 1/4P	1/4N to 1/4P	1/8 to 1/8
...Classic (Deluxe & Custom)	6-3 1/2 x 4 1/4	127	Ch-14	45	45	.016H	.016H	.016	.32	.035	58	6°11'	1/4N to 1/4P	1/4N to 1/4P	1/8 to 1/8
...Classic 400 (Std. Eng.); Classic (Del. & Cus.) (Eng. Opt.)	6-3 1/2 x 4 1/4	127	Ch-14	45	45	Hyd	Hyd	.016	.32	.035	58	6°11'	1/4N to 1/4P	1/4N to 1/4P	1/8 to 1/8
...Ambassador	8-4 3/4 x 4 1/4	250	Ch-14	30	45	Hyd	Hyd	.017	.34	.035	TC	6°11'	1/4N to 1/4P	1/4N to 1/4P	1/8 to 1/8
CHEKGER MOTORS CORP.															
Checker... Superba, Marathon	6-3 1/2 x 4 3/8	80	Ch-18	30	44	.014H	.014H	.020	.39	.029	48	7	2P	1/4P to 1/4P	1/8 to 1/8
...Superba, Marathon (Eng. Opt.)	6-3 1/2 x 4 3/8	122	Ch-14	30	44	.017H	.023H	.020	.39	.032	31 1/2	7	2P	1/2P to 1/2P	1/8 to 1/8
CHRYSLER CORP.															
Chrysler... Newport	8-4 1/2 x 3 5/8	265	CA-14	45	45	Hyd	Hyd	.017	.30	.035	108	61 1/2	0 to 1N	1/4P to 1/4P	1/8 to 1/8
...300	8-4 1/2 x 3 5/8	305	CA-14	45	45	Hyd	Hyd	.017	.30	.035	108	61 1/2	1/4P to 1/4P	1/4P to 1/4P	1/8 to 1/8
...300 (Eng. Opt.)	8-4 1/2 x 3 5/8	340	CA-14	45	45	Hyd	Hyd	.017	.37	.035	108	61 1/2	1/4P to 1/4P	1/4P to 1/4P	1/8 to 1/8
...New Yorker	8-4 1/2 x 3 5/8	340	CA-14	45	45	Hyd	Hyd	.017	.30	.035	108	61 1/2	1/4P to 1/4P	1/4P to 1/4P	1/8 to 1/8
...300-H	8-4 1/2 x 3 5/8	380	CA-14	45	45	.015H	.024H	.017	.37	.035	108	61 1/2	1/4P to 1/4P	1/4P to 1/4P	1/8 to 1/8
Dodge... Dart (Std. Eng.); Lancer (Eng. Opt.)	6-3 1/2 x 3 1/2	101	CA-14	46	46	.010H	.020H	.020	.43	.035	21 1/2	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
...Dart	6-3 1/2 x 3 1/2	145	CA-14	46	46	.010H	.020H	.020	.43	.035	21 1/2	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
...Polaris (Std. Eng.); Dart (Eng. Opt.)	6-3 1/2 x 3 5/8	230	CA-14	45	45	.010H	.018H	.017	.30	.035	58	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
Imperial... Custom, Crown, LeBaron	8-4 1/2 x 3 5/8	305	CA-14	45	45	Hyd	Hyd	.017	.37	.035	108	61 1/2	1/4P to 1/4P	1/4P to 1/4P	1/8 to 1/8
Plymouth... Valiant	6-3 1/2 x 3 1/2	101	CA-14	46	46	.010H	.020H	.020	.43	.035	21 1/2	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
...Savvy, Belvedere, Fury (Std. Eng.); Valiant (Eng. Opt.)	6-3 1/2 x 4 1/8	145	CA-14	46	46	.010H	.020H	.020	.43	.035	21 1/2	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
Savvy, Belvedere, Fury	8-3 1/2 x 3 1/8	230	CA-14	45	45	.010H	.018H	.017	.30	.035	58	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
Sport Fury (Std. Eng.); Savvy, Belvedere, Fury (Eng. Opt.)	8-4 1/2 x 3 5/8	305	CA-14	45	45	Hyd	Hyd	.017	.37	.035	108	71 1/2	0 to 1P	1/4P to 1/4P	1/8 to 1/8
FORD MOTOR CO.															
Ford... Falcon	6-3 1/2 x 2 1/4	85	AL-18	45	45	.018H	.018H	.025	.37	.034	58	7	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
...Falcon (Eng. Opt.)	6-3 1/2 x 2 1/4	101	AL-18	45	45	.018H	.018H	.025	.37	.034	58	7	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
...Fairlane	6-3 1/2 x 2 1/4	101	AL-18	45	45	.018H	.018H	.025	.37	.034	58	7	Data not available at time of going to press.	Not as yet available.	
...Galaxy	6-3 1/2 x 3 1/2	138	AL-18	45	45	AM	AM	.026	.37	.034	68	6 1/2	1/4N to 1/4P	1/4P to 1/4P	1/8 to 1/8
...Galaxy	6-3 1/2 x 3 1/2	170	CA-18	45	45	.018H	.015	.27	.034	.035	58	6 1/2	1/4N to 1/4P	1/4P to 1/4P	1/8 to 1/8
...Galaxy (Eng. Opt.)	8-4 1/2 x 3 1/2	220	CA-18	45	45	Hyd	Hyd	.015	.27	.034	58	6 1/2	1/4N to 1/4P	1/4P to 1/4P	1/8 to 1/8
...Galaxy (Eng. Opt.)	8-4 1/2 x 3 1/2	300	AL-18	45	45	Hyd	Hyd	.015	.27	.034	58	6 1/2	1/4N to 1/4P	1/4P to 1/4P	1/8 to 1/8
...Thunderbird	8-4 1/2 x 3 1/2	300	CA-18	45	45	Hyd	Hyd	.015	.27	.034	78	6 1/2	4 1/2N to 1 1/4N	0 to 1P	1/8 to 1/8
Lincoln Continental... Comet	8-4 1/2 x 3 1/2	300	AL-18	45	45	Hyd	Hyd	.015	.27	.034	58	7	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
Mercury... Comet	8-4 1/2 x 3 1/2	101	AL-18	45	45	.018H	.018H	.025	.37	.034	58	7	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
Meteor	8-4 1/2 x 3 1/2	145	AL-18	45	45	.018H	.018H	.025	.37	.034	58	7	Data not available at time of going to press.	Not as yet available.	
Monterey	8-4 1/2 x 3 1/2	170	AL-18	45	45	.018H	.018H	.025	.37	.034	58	7	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
Monterey (Eng. Opt.)	8-4 1/2 x 3 1/2	220	AL-18	45	45	Hyd	Hyd	.015	.27	.034	58	6 1/2	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
Monterey (Eng. Opt.)	8-4 1/2 x 3 1/2	300	AL-18	45	45	Hyd	Hyd	.015	.27	.034	58	6 1/2	1 1/2P to 2P	1/4P to 1/4P	1/8 to 1/8
GENERAL MOTORS CORP.															
Buick... Special Standard	6-3 1/2 x 3 1/2	135	AC-14	45	45	Hyd	Hyd	.016	.30	.033	71 1/2	71 1/2	0 to 1N	3/4N to 3/4P	1/8 to 1/8
Special Deluxe	6-3 1/2 x 2 1/2	155	AC-14	45	45	Hyd	Hyd	.016	.30	.033	71 1/2	71 1/2	0 to 1N	3/4N to 3/4P	1/8 to 1/8
Special Skylark (Std. Eng.); Special Std. & Del. (Eng. Opt.)	6-3 1/2 x 2 1/2	180	AC-14	45	45	Hyd	Hyd	.016	.30	.033	71 1/2	71 1/2	0 to 1N	3/4N to 3/4P	1/8 to 1/8
LaSabre	6-3 1/2 x 3 1/2	200	AC-14	45	45	Hyd	Hyd	.016	.30	.033	71 1/2	71 1/2	0 to 1N	3/4N to 3/4P	1/8 to 1/8
Invicta, Electra 225 (Std. Eng.); LaSabre (Eng. Opt.)	8-4 1/2 x 3 1/2	325	AC-14	45	45	Hyd	Hyd	.016	.30	.033	128	9 1/2	1/4N to 1/4N	0 to 1P	1/8 to 1/8
Cadillac... 62, 63, Fleetwood 60 & 75	8-4 1/2 x 3 1/2	325	AC-14	44	44	Hyd	Hyd	.016	.30	.035	58	6	1/4N to 1/4N	3/4N to 3/4P	1/8 to 1/8
Couval... Chevy II	6-3 1/2 x 2 1/2	80	AC-14	46	46	Hyd	Hyd	.019	.33	.035	78	7	3P 3 1/2P	0 to 1P	1/8 to 1/8
...Chevy II	6-3 1/2 x 3 1/2	90	AC-14	46	46	Hyd	Hyd	.019	.33	.036	48	7 1/2	1/4P to 1/4P	0 to 1P	1/8 to 1/8
Biscayne, Bel Air, Impala	8-3 1/2 x 3 1/2	120	AC-14	46	46	Hyd	Hyd	.019	.33	.036	88	7 1/2	1/4P to 1/4P	0 to 1P	1/8 to 1/8
Biscayne, Bel Air, Impala (Eng. Opt.)	8-3 1/2 x 3 1/2	135	AC-14	31	46	Hyd	Hyd	.019	.21	.036	58	7 1/2	1/4N to 1/4N	0 to 1P	1/8 to 1/8
Biscayne, Bel Air, Impala (Eng. Opt.)	8-3 1/2 x 3 1/2	170	AC-14	46	46	Hyd	Hyd	.019	.30	.036	68	7 1/2	1/4N to 1/4N	0 to 1P	1/8 to 1/8
Corvette	8-4 1/2 x 3 1/2	250	AC-14	46	46	Hyd	Hyd	.019	.30	.036	78	7 1/2	1/4N to 1/4N	0 to 1P	1/8 to 1/8
Dynamic 88	8-4 1/2 x 3 1/2	155	AC-14	45	45	Hyd	Hyd	.016	.30	.030	58	4	1 1/2P to 2 1/2P	1/4N to 1/4N	1/8 to 1/8
...Super 88	8-4 1/2 x 3 1/2	280	AC-14	45	45	Hyd	Hyd	.016	.30	.030	58	10	1/4N to 1/4N	3/4N to 3/4P	1/8 to 1/8
Starfire	8-4 1/2 x 3 1/2	330	AC-14	45	45	Hyd	Hyd	.016	.30	.030	58	10	0 to 1N	1/4N to 1/4N	1/8 to 1/8
...SS	8-4 1/2 x 3 1/2	345	AC-14	45	45	Hyd	Hyd	.016	.30	.030	58	10	0 to 1N	1/4N to 1/4N	1/8 to 1/8
Pontiac... Tempest	8-4 1/2 x 3 1/2	330	AC-14	45	45	Hyd	Hyd	.016	.30	.030	58	10	0 to 1N	1/4N to 1/4N	1/8 to 1/8
Tempest	8-4 1/2 x 2 1/2	110	AC-14	30	45	Hyd	Hyd	.016	.75	.030	68	8 1/2	1/4N to 2 1/4N	1/4N to 1/4N	1/8 to 1/8
Catalina, Star Chief	8-4 1/2 x 3 1/2	185	AC-14	46	46	Hyd	Hyd	.016	.30	.032	58	8 1/2	1/4N to 2 1/4N	1/4N to 1/4N	1/8 to 1/8
Bonneville	8-4 1/2 x 3 1/2	215	AC-14	30	45	Hyd	Hyd	.016	.30	.036	68	4 1/2	1/4N to 2N	1/4N to 1/4N	1/8 to 1/8
Grand Prix	8-4 1/2 x 3 1/2	235	AC-14	30	45	Hyd	Hyd	.016	.30	.036	68	4 1/2	1/4N to 2N	1/4N to 1/4N	1/8 to 1/8
Studebaker-PACKARD CORP.															
Studebaker... Lark	8-3 1/2 x 4	112	Ch-14	45	45	.024H	.024H	.020	.39	.036	28	6	3/4N to 3/4P	5 to 1P	1/8 to 1/8
Lark (Std. Eng.); Hawk (Eng. Opt.)	8-3 1/2 x 3 1/2	180	Ch-14	45	45	.024H	.024H	.017	.29	.036	48	6	3/4N to 3/4P	0 to 1P	1/8 to 1/8
Hawk (Std. Eng.); Lark (Eng. Opt.)	8-3 1/2 x 3 1/2	210	Ch-14	45	45	.024H	.024H	.017	.29	.036	48	6	3/4N to 3/4P	0 to 1P	1/8 to 1/8

ABBREVIATIONS

—Left side only; right side, 0 to 1P.
—Left side only; right side, 1/2P to 1/2P.

AC—Automatic mechanical adjustment.

B—Before top center.

AL—Autolite.

CA—Champion or Autolite.

Ch—Champion.

H—Hot.

Hyd—Hydraulic valve lifters.

N—Negative.

P—Positive.

TC—Top center.

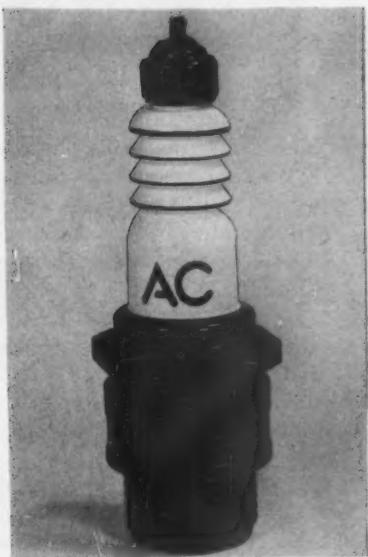
MERCHANDISING and PROMOTION



E. Edelmann & Co., Chicago, Ill. offers a special combination offer. For a limited time dealers can get a free No. 88 Battery Filler when they purchase a No. 45 "thermo-matic" Battery Tester. These instruments, company states, permit speedy, accurate testing and servicing of all batteries. The "45" self-correcting, thermo-matic Battery Tester, automatically shows correct battery condition in a single reading on the dial chart.

United Motors Service, Division of General Motors Corp., Detroit, Mich. is offering an 11 × 24 inch fluorescent illuminated clock display to dealers as part of the giant change-over to incorporate all United Motors Service products under one name . . . United Delco. These attractive units offer the dealer the option of promoting eight individual services of his own or any of the thirteen Delco Products by means of easily changed snap-on plastic panels. As multipurpose indoor displays, these clock signs can identify dealers at the window level or within the establishment. They will double as night lights as well.

AC Spark Plug Division, General Motors Corp., Flint, Mich., announces a special feature included in the Fall spark plug sales campaign. It is a plastic windshield washing squeeze bottle shaped in the replica of an AC Fire Ring spark plug. Bottles feature a snap close top that folds down for positive closure. The novel and useful squeeze bottles will be



in view of motorists every time the dealer washes a windshield and can help stimulate salesmaking conversation. The plastic spark plug bottles are available from AC distributors.

Signal-Stat Corporation, Brooklyn, N.Y., is offering a free cabinet with the purchase of new Coni-Seal Wheel Cylinder Brake Parts Assortments. The new assortments, CSA-5 and CSA-6, provide a good balance of Coni-Seal Wheel Cylinder Cups, Neoprene Boots and Springs giving service departments maximum passenger car coverage at minimum inventory. Also included is a kit to convert "U" ring type cups in the 1946 to 1956 Chrysler products to more proficient Coni-Seal cups, company states.

Monroe Auto Equipment Company, Monroe, Mich. has a merchandising theory that "you've got to show 'em to sell 'em." Company states that its barrel demonstrator does this. Shock absorber demonstrator barrels can be set up at dealerships, garages and service stations. On top of the steel barrel are mounted two handles attached to the pistons on two shock absorbers. One is a new Monro-Matic, the other is a worn-out shock absorber. Company states that few customers can resist pushing and pulling on the handles. When they do, they find out for themselves the difference between a new shock absorber and one that's had its bumps.



New Products Shopping Center

Tool Box Merchandiser

Designed to hold a combination of tool boxes

Kennedy Manufacturing Co., Van Wert, Ohio: A new display merchandiser is being introduced. The new merchandiser is constructed of tubular side frames, three 20-gauge formed shelves and a flat back panel at

the top which contains a literature rack. Packed knocked-down for shipping, the new display is quickly assembled, company states. The Kennedy Kits merchandiser has been designed to hold a combination of tool boxes and chests to suit the needs of the local automotive industry supplier. It requires only 32 x 21

inches of floor space. Write: Kennedy Manufacturing Co., Dept. 112, Van Wert, Ohio.

Engine Positioning Tool

For removing or fitting the engine into place

Ideal Manufacturing Company: A new engine positioning tool named Tilt-A-Bar has been introduced. This tool makes easy the job of removing or fitting the engine into place under the fire wall, company states. It reduces man hours greatly, it is stated, and is easily a one-man operation. Shoving and jamming with crow bars which often damages engine parts is eliminated. Standard $\frac{1}{2}$ inch ratchet or impact wrench fits into tool and for lowering or raising engine. Write: The Ideal Manufacturing Co., Oskaloosa, Iowa.

Wheel Cylinder Assemblies

Designed to assure positive brake fluid seal

Grey-Rock Division Raybestos-Manhattan, Inc.: Available is a complete line of wheel cylinder assemblies and repair kits. Designed for all American-made cars and trucks, and most foreign makes, the new hydraulic brake parts are said to assure a positive brake fluid seal, while permitting free movement of pistons and cups. Walls of wheel cylinders are "bearingized" to 20-micro inches, providing a finished bore that approaches the smoothness of glass. Internal parts are coated with a preservative fluid. Grey-Rock repair kits include the wheel cylinder spring, two piston cups, and two rubber boots. Write: Grey-Rock Division, Raybestos-Manhattan, Inc., Manheim, Pa.

Axle-Correction Set

Increases profit on car and truck wheel-aligning jobs

Hunter Engineering Co.: A new Axle-Correction Set has been continued on page 88



Makers of quality imported cars specify Lucas products as original equipment. To insure customer good will always replace Lucas with Lucas. A Lucas representative will be glad to help you plan a basic inventory.



United States Factory Branches

LUCAS ELECTRICAL SERVICES, INC.
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BRAKES AND SHOCK ABSORBERS

Take your pick for super-quick **CARBURETOR CLEANING!** **GUNK** offers you a choice of two

GUNK®

H.S.

the world's
most powerful
carbon
digestive
solvent!



- water sealed for long-life
- strips carbon, paint, grease fast
- cleans carburetors, pistons, engine blocks, automatic transmission parts completely
- 1½, 3 and 6 gal. Pail Kits — 30 and 55 gal. Open Head Drums — baskets available for all sizes

NEW!

GUNK®

C-C

the easiest
to handle
carburetor
cleaner
ever!



- no lingering offensive odor
- will not burn hands
- 100% active — long bath life
- 5 gal. Pails with or without baskets—15, 30 and 55 gal. Closed-Head Drums

Either one—GUNK H.S. or GUNK C.C. *cleans cleaner!* Both are safe, effective, and economical. See your GUNK Jobber and choose the one that suits you best . . . but, always "Dunk 'Em In Genuine GUNK"!

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GUNK CHICAGO CO., River Forest, Illinois
Serving the Midwest and Southwest
RADIATOR SPECIALTY CO., Charlotte, No. Carolina
Serving the East, Southeast and Far West
FLORIDA RADIATOR SPECIALTY CO. OF CANADA LTD., TORONTO



Safety Boom

Continued from page 43

tive service industry, all of us, have both a responsibility and an opportunity.

The responsibility is to protect the lives and property of our customers. We can do this best by taking pride in our work; by using the best products available; by doing the best job we possibly can every time.

The opportunity is to prepare now for a more profitable future. We can do this best by establishing what our customers want and need most: a complete and reliable safety service program.

From manufacturer to jobber to dealer to point-of-sale and installation, the rewards will be great.

And let me say this: somewhere in someone's mind, as this article is read, will be the thought that another get-rich-quick scheme is being proposed.

Nothing could be further from the truth.

Our industry is still comparatively young. It has changed greatly. It is changing constantly. Our customers are more numerous, more knowledgeable, more demanding. They are driving better cars . . . faster cars . . . mechanically complicated cars. The accident and fatality rates are going up. Throughout the nation there is a growing clamor to protect the motorist.

No, we are not taking advantage of a good thing by selling safety service and safety equipment. It is, rather, a good thing we are doing, for motorists, and a good business to be building.

With this in mind, let's now consider some of the principal elements of a good safety service program. Tried and true, or new and experimental, each of the following recommendations deserves serious consideration:

Direct mail campaigns. Post cards to remind customers it's time for an oil change and lube job are used at many service stations. On the next mailing, add a short note to suggest a Safety Check-Up. Repeat this suggestion whenever state inspection periods come around. And remember, many manufacturers provide promotional literature for

Continued on page 86

New from Ken

automatic SELF-LEVELING **BATTERY FILLERS**

- FLOW AUTOMATICALLY!
- SHUT OFF AUTOMATICALLY!
- FILL TO CORRECT LEVEL!
- BIG 2½-QUART CAPACITY

Ken's New B-70 Automatic Battery Filler quickly fills to correct level—shuts off automatically. No spills . . . No dripping. Ideal for dry charge batteries. Both valve and container are made of high-impact styrene and polyethylene to withstand long, hard use with either water or battery acids. Also features the only automatic valve for which all parts are replaceable!



B-70

Dual-Automatic **FILLER and TESTER**

Another "first" by Ken, this B-71 Automatic Filler and Tester is combined in a single unit to make battery service a one-stop operation. Fills batteries to correct level automatically.

Tests either 6 or 12 volt systems with visual trouble indicator. Extra wire, with simple clip, makes it easy to locate many other car shorts.



B-71

Find trouble
fast and easy

- Sell more charges
- Sell more batteries
- Sell more service



CALL YOUR JOBBER

Put one of these sales builders to work for you now!



Get your pocket-size copy of Ken's all-new, complete-line catalog. Ask your jobber or write Ken direct.

K-951-125 A

THE KEN-TOOL MFG. CO.

AKRON 5, OHIO

Largest exclusive manufacturer of Specialized Tire Changing Tools, Equipment, and Garage Tools . . . Known and used around the World.

New Literature

Sales Booklet

Gives information on automotive sales and service

Dill Manufacturing Company: A new 16-page book, "Tips for Better Sales & Service" has just been published. The free literature is designed to provide personnel in the gasoline, and fleet and automotive service field with

the information on sales and service. Written in feature article style, the book covers such subjects as "new plans for increased valve sales"; "how to increase sales of tires, caps, and air pressure gauges; "how to increase sales of tire valve cores"; "how to get longer life, safer service from tires"; how to repair tubeless tires"; and others.

Write: Dill Manufacturing Co., 700 East 82nd St., Cleveland 3, Ohio.

Air Compressor Catalog

Covers complete line of air compressors

Lincoln Engineering Company: A 16-page catalog, covering company's complete line of air compressors for automotive, industrial and contractor applications, has recently been published. Included in catalog 20 is data

FIRST CLASS

In any language, "FIRST CLASS" means tops . . . the best there is.

We work hard to make our ignition parts that way because we must have the complete confidence of those who install **TUNGSTEN** Ignition Parts and those who sell **TUNGSTEN** Ignition Parts.

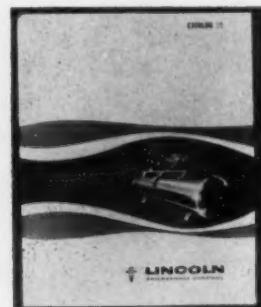
As a result, **TUNGSTEN** Ignition Parts are always engineered to produce "FIRST CLASS" jobs with fewer re-do's and fewer headaches.

If you are not using **TUNGSTEN** Ignition Parts now, we suggest you contact your **TUNGSTEN** Distributor. He'll be glad to talk **TUNGSTEN** to you.

Write for catalog

TUNGSTEN CONTACT IGNITION

TUNGSTEN CONTACT MANUFACTURING CO., INC., North Bergen, New Jersey



on more than 200 models—both gasoline and electric driven—featuring automatic start-and-stop and constant-running units, plus illustrations and descriptions of compressors available with either horizontal or vertical tanks. Write: *Lincoln Engineering Co., 4010 Goodfellow Blvd., St. Louis 20, Missouri.*

Lift Bulletin

Describes line of "Quick Spot" automotive lifts

The Joyce-Cridland Company: Just issued is bulletin #171-L describing company's re-styled line of "Quick Spot" automotive lifts with the "Pack-Hite" profile. The four-page bulletin tells how the new design (only 3½ in. high, about the same height as a pack of king-size cigarettes) eliminates clearance problems with low-slung cars and sloping floors. Superimposed silhouettes of the old and new style lifts demonstrate this improvement. Write: *The Joyce-Cridland Co., 2027 E. First St., Dayton 3, Ohio.*

GET IN ON THE "GROUND FLOOR" WITH
LEECE-NEVILLE 6000-SERIES ALTERNATORS
NOW AVAILABLE TO YOU!

NEW LEECE-NEVILLE
40-AMP ALTERNATOR



... replacement for Chrysler
alternator—also fits all Ford,
General Motors
and Chrysler vehicles

Sell the generator of the future NOW!

Automotive experts predict that present D. C. Generators soon will be obsolete—replaced by the more efficient A. C. Generator known as the “alternator”. You have the opportunity—now—to get in on the “ground floor” with alternator sales and service. And, more important, you can handle the alternator manufactured by the pioneer in this field. Leece-Neville introduced alternators for automotive use in 1945 and offers you a proved, quality product backed by more than 16 years of extensive field service in all kinds of duty and on all kinds of vehicles. For complete details, contact your local Leece-Neville Distributor or send in the coupon.

Ask about Leece-Neville Fractional D. C. Motors, too!



THE LEECE-NEVILLE CO., Dept. MA-11
1374 East 51st St., Cleveland, Ohio

Please send me more information about:
 6000-Series Alternator D. C. Motors

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Mercury Meteor Continued from page 39

Cushion-Link to provide a soft, smooth ride and eliminate road harshness. Wheels are 14 inches with five inch rims and the new narrow band whitewall tires are optional equipment at extra cost. Tire size is 6.50 inch with 7.00 inch option. Brakes are self-adjusting. Also contributing to a quiet ride is the extensive use of sound-deadening material throughout the entire car. Galvanized steel is used

throughout the underbody in the critical structural areas to resist rust.

The chassis is lubricated at the factory with special lubricant good for 30,000 miles. The cooling system will be filled with coolant good for 30,000 miles or two years, if the system remains in good repair and a new fuel filter with replaceable element also is good for 30,000 miles or two years.

A new compact V-8 engine with 221 cubic inch displacement and overhead valves with hydraulic lifters is offered as an option at extra cost. Both the V-8 and the standard 170 cubic inch 6 cylinder Meteor engines have automatic choke. The V-8 is a new design engine which utilizes all the new foundry precision moulding techniques to reduce weight, but add more uniform strength to cylinder block casting.

Styling

The front end of the Meteor is styled to give the appearance of being low and wide. Dual headlamps are mounted in a double concave stamped aluminum grille. The front bumper wraps around fully for complete protection, and the parking lamps are located near the outer ends of the bumper. Exterior identification includes Mercury block lettering across the front of the hood and Meteor script on the side of the front fender. The fenders also have a unique top ornament.

Doors incorporate a tube theme that extends into a one-piece quarter panel and terminates in a jet-style tail lamp with projecting lens to suggest length. A full-length moulding extends from the front fender to the rear quarter. Side ornamentation incorporates a lower moulding on the quarter panel just above the rear wheel, with three horizontal blade type ornaments forward of the rear wheel opening.

The oval theme of the deck lid, lower back panel and rear bumper is accented by a full width lower back panel applique with mouldings on the deck lid, the lower back panel and the quarter panel extension. Bright window frames, bright drip mouldings and bright applique at the rear roof pillar are standard. The Continental-type roof has crisp lines and flat rear window.

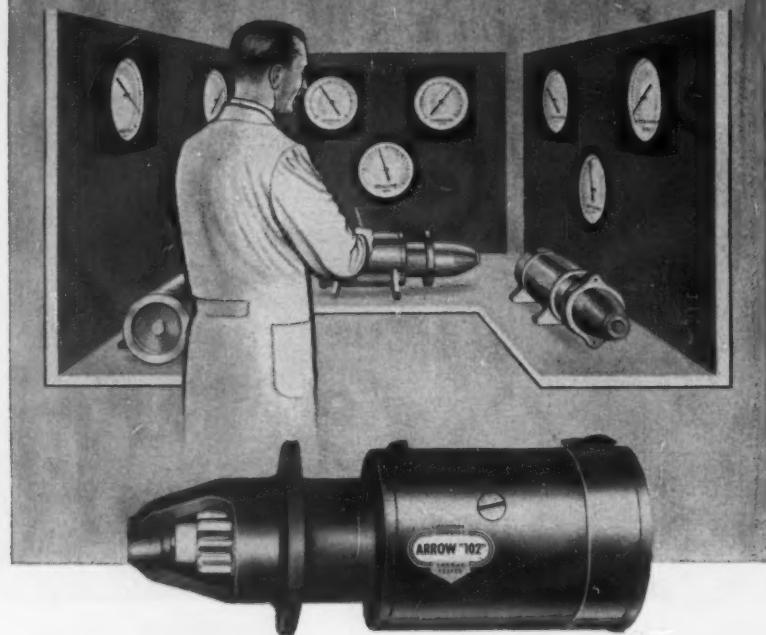
Mercury identification is spelled out on the deck lid.

Attractive Interiors

Attractive interiors incorporate trim schemes, materials and colors which are complemented by a distinctive instrument panel, cluster and applique. The instrument panel, with spacious glove box, is an integral welded part of the body. The steering wheel is color-keyed to the interior trim, as are the rubber floor mats.

TORQUE TESTED STARTERS

PROVEN FOR PERFORMANCE



Arrow Factory Rebuilt Starters are proven for performance by Arrow's own specially developed "Torque Test." This is a multiple testing procedure which includes: 1 - A free-running test, 2 - A load test, 3 - A lock test.

These tests are calibrated in foot pounds of torque. They measure amperage and voltage draw under conditions more rugged than actual service and match OEM specifications.

Every Arrow Starter must pass the "Torque Test" before leaving the plant. Any that fails is rejected and reprocessed. This is the Arrow Standard of quality... every Starter (and every Generator) must be proven fit for service before it is shipped.

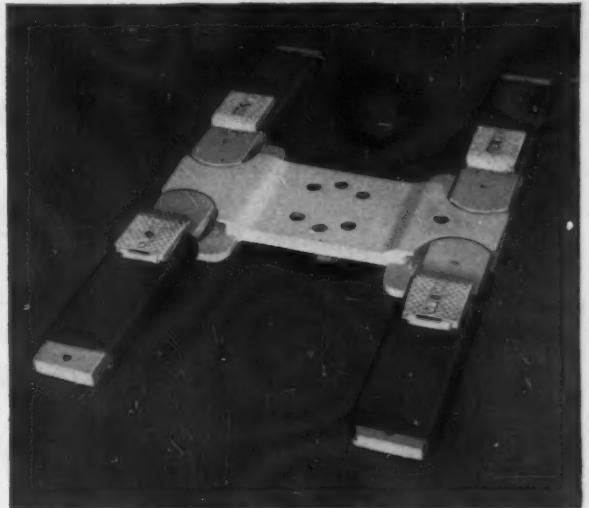
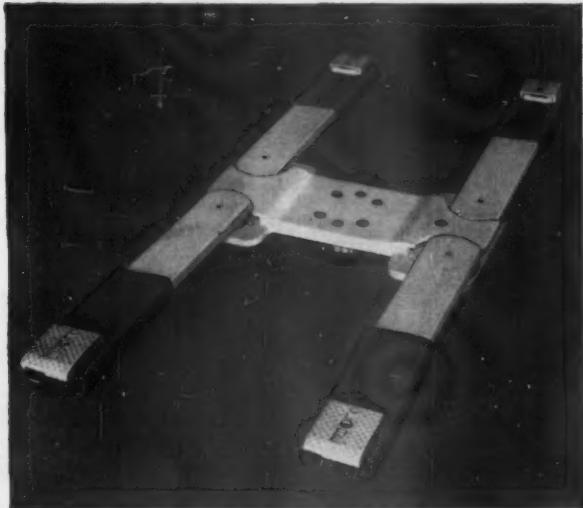
For more information, write ...



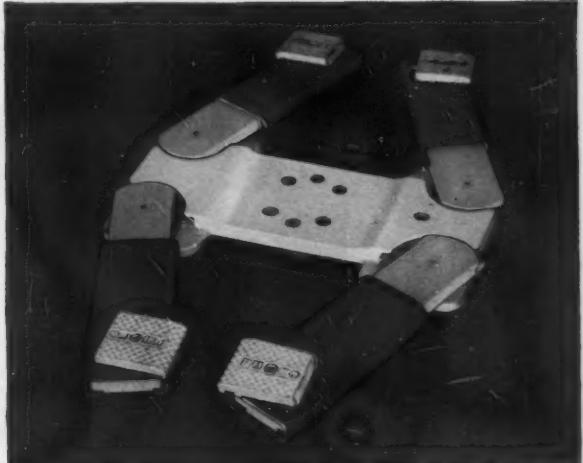
ARROW ARMATURES COMPANY

Boston 34, Mass. • Spartanburg, S. C.

Will tomorrow's cars



be longer?...or shorter?



wider?...or narrower?

Why worry? Install a Globe Frame-Kontact hoist now and be ready for anything. This ground hugging, low profile hoist already handles the biggest domestic cars and the smallest foreign models—without adapters, and with inches to spare. It could easily handle new-design cars longer, shorter, wider or narrower. And it's the only hoist on the market that you can Pre-Set quickly for 3 out of 4 cars on the road today. So if you want faster, easier hoist operation, plus complete protection for the future, make sure you get a Globe hoist. Right now, talk with your nearby Globe man. Or write for literature. Globe Hoist Company, East Mermaid Lane at Queen St., Philadelphia 18, Pa.

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®

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our only product line*

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Wagner
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BRAKE SERVICE PRODUCTS

unparalleled for quality



Wagner Lockheed®
the No. 1 Line
O.E.M. QUALITY
for 37 consecutive years

The safety of your customers can depend upon the quality of the brake products you use. So, for safety's sake standardize on Wagner Lockheed Brake Parts... Brake Fluid... Brake Lining. It's the complete line—covers all American and many foreign-made cars. You'll turn out better work, and you'll be time and money ahead by using these Wagner Lockheed products of O.E.M. (Original Equipment Manufacturer) Quality.

ONE CALL GETS ALL your brake service needs from one source—your Distributor of Wagner Lockheed Products.

THE LEADER

increase your sales...turn out better, safer brake jobs

Wagner® Lockheed®

offers you more real help than any other manufacturer in the brake service field



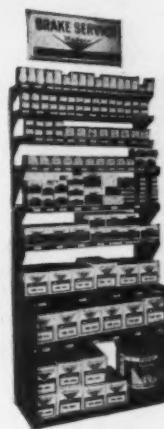
PROMINENT IDENTIFICATION

Become the brake service headquarters in your area. You get PROMINENT IDENTIFICATION through a brilliant electric sign or a large curb sign. Choice is available to Wagner Lockheed Franchised Dealers. Ask your distributor how easily you can qualify.



SERVICE MANUAL, PARTS CATALOG, BRAKE SERVICE BULLETINS—provide you with latest information...“HOW-TO-DO-IT” Maintenance Manual containing brake service diagnosis saves time for mechanics...FREE CATALOG covering complete line is yours for the asking...And up-to-the-minute Brake Service Bulletins furnish valuable tips on solving brake problems.

DIRECT MAIL CARDS, NEWSPAPER MATS, POSTERS—are available to help you get more customers to come to you for brake service.



BRAKE PRODUCTS MERCHANTISER

saves you time. It lets your distributor salesman keep your inventory balanced. You have the brake products you want on hand—when you need them. Merchantiser comes to you with your choice of four balanced assortments, each providing big coverage with small inventory. Steel cabinet measures 6 x 3 x 1½ feet.



“HOW-TO-DO-IT” INSTRUCTION SHEETS

—another *first* introduced by Wagner—are included in every box containing Wagner Lockheed Lined Brake Shoes, and in all Power Brake Repair Kits...These easy-to-follow instructions make it simple for the mechanic to turn out good work.

BRAKE SERVICE CLINICS sponsored by Wagner Distributors help your mechanics learn the latest methods in brake service to turn out better, safer brake jobs.

MAIL COUPON TODAY!

Get complete information.

Wagner Electric Corporation

6498 Plymouth Ave., St. Louis 33, Mo., U.S.A.
(Branches in principal cities in U.S. and in Canada)
Manufacturers of LOCKHEED® Products

Send details on Franchised Dealer program and sales helps.

Name _____

Firm _____

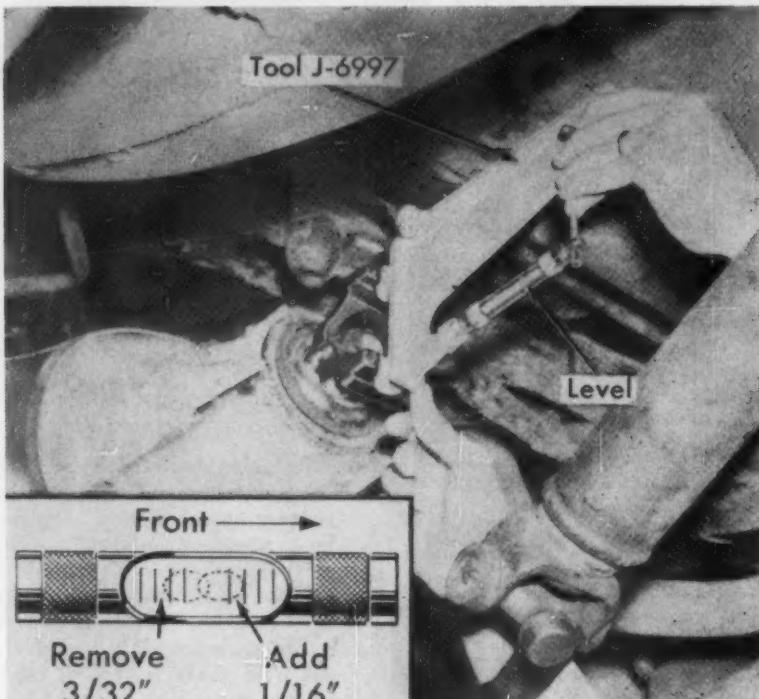
Address _____

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WA61-11

Readers' Clearinghouse

By John K. Montgomery, Technical Editor



Gage in position for checking pinion angle

Can't Locate Annoying Vibration on 1958 Cadillac

Would appreciate helpful information regarding 1958 Cadillac Coupe DeVille. The car picks up a terrific vibration throughout the entire auto at 65 mph. This vibration increases with an increase in miles per hour. Up to present time following work has been done to the car: 3 new universal joints installed, new center joint bearing unit, rebuilt the entire rear end, new brake lining, pack and adjust front wheel bearings, replaced rear section of drive shaft, had drive shaft balanced, rear axle bearings inspected, new tires, balanced 4 wheels, front end alignment. Checked hydramatic. None of above has solved the problem.

George T. Diskant,
Chicago 41, Ill.

FROM work done to eliminate this condition, I would say you have done a very thorough job. One thing you didn't mention checking was the pinion angle. The proper angle is very important in the reduction of propeller shaft vibration. This angle is controlled by shims placed between the front mounting bracket for the lower control link and the number 4 bracket. A special gage is needed for checking this angle. I would suggest contacting your local Cadillac dealer. Perhaps he might loan you his gage. Otherwise they will have to do this operation. Also check an unbalanced torous cover. Is it necessary for the rear axle to turn to get this vibration? If not, try disconnecting the fan and generator belts. I have seen cases where the generator, powersteering or fan blades caused a terrific vibration.

Safety Boom

Continued from page 79

mailing to customers and prospects.

Incentive plans. Modest rewards for special effort will encourage employees to look beyond the job at hand. Gas pump attendants and mechanics are much more likely to look for and find all possible repair jobs when an incentive plan goes into effect.

Point-of-sale displays. Signs to tell customers that brand name products are available here can be most effective. First, they signify that quality materials will be used. Second, they jog the memory of customers who have put off having essential work done on their cars.

Technical training. New product literature and the maintenance and installation catalogs of equipment manufacturers should be made available to all employees in customer service positions. If at all possible, arrange for employees to attend training clinics such as those sponsored by Grey-Rock and many responsible manufacturers.

Safety campaigns. All safe-driving campaigns deserve your full cooperation, and active participation, will pay off for you in many ways. Your quality repair work, of course, is another contribution. Even a "Drive Safely" sign in your window, driveway, or garage is well worthwhile.

Spot safety checks. Flat spots on tires, noisy shocks, one-eyed headlights and dead blinkers, brake pedal slippage, and many other safety hazards can be turned into profitable repair jobs by alert employees. Spot safety checks should, in fact, be made on every car at the gas pumps. Those cars that come in for wash, wax, and lube jobs, or minor surgery, can be given a more thorough inspection. Pulling the right front wheel, for example, will quickly reveal whether a brake job may be called for.

Customer courtesy. A thank-you-for-coming-in, or few moments of small talk with customers, will often open the door to unexpected jobs. Mention that it's a good idea to pressure bleed the hydraulic system and refill with fresh brake fluid at least once a year, and you may corner a complete brake system

Continued on page 88

WAGNER[®] LOCKHEED[®] . . . NUMBER ONE IN O.E.M. QUALITY FOR 37 YEARS

Wagner
Lockheed

BRAKE PARTS reduce "comebacks"



**O.E.M. proved
and pre-tested...
you know they'll
fit right...
work right!**

THESE PARTS WORK RIGHT because Wagner Lockheed Brake Parts for service needs are made to the same specifications as those used for OEM. They have been thoroughly researched and tested, not only by Wagner, but by car, truck and bus manufacturers. They are pre-tested in actual use on millions of vehicles before they become available for service requirements.

The Wagner Lockheed line is the most complete line of hydraulic brake parts on the market. It includes master and wheel cylinders, repair kits, pistons, springs, washers, cups, hose, brake cable and all related items for every make and model vehicle.

For details on this line of O.E.M. (Original Equipment Manufacturer) Quality—ask your Wagner Distributor... or write us for Catalog AU-500.

Wagner Electric Corporation

6498 PLYMOUTH AVENUE, ST. LOUIS 39, MO., U.S.A.

Manufacturers of **LOCKHEED[®]** Products

New Products *Continued from page 78*

introduced. The concern states that this set is designed for both rear-axle housing and front-axle work on passenger cars, light pick-ups and trucks up to 2-ton capacity. This 21-piece set is available with or without two 12-ton hydraulic jacks of the type for operation with pump down and handle in horizontal position. Write: Hunter Engineering Co., Hunter Ave. and Ladue Road, St. Louis 24, Missouri.

Clutch Spring Compressor

For use on all automotive transmissions

Malray Products, Inc. A new tool for compressing piston return springs on all automatic transmissions is currently being introduced. "Clutch Spring Compressor Tool" adjusts to fit all automatic transmission clutch drums, it is said. It is a unit complete

within itself, states company. Simple to operate—the adjustment screw quickly adapts the arms to diameter of spring retainer. A short pull on the handle compresses spring and holds pressure constant, without use of hands, while snap ring is being removed or replaced. Write: Malray Products, Inc., P.O. Box 47-885, Miami, Florida.

Body Filler

Retains flexibility and resiliency after curing and painting

Martin-Senour Co.: A new flexible body filler which it is claimed, won't jar loose under severe conditions has just been introduced. Called Blu-Flex, it is a permanent repair filler for dents, holes, scratches, flaws, cracks and leaks in metal, wood or plastic. Write: Martin-Senour Co., 2500 S. Senour Ave., Chicago, Ill.

Safety Boom

Continued from page 86

overhaul, or a complete safety inspection job. At the least, your customer is more likely to return to you for such services.

It seems quite likely that the United States will eventually have both uniform traffic laws and car inspection procedures. Until that time, however, the automotive service industry must continue to set standards of quality for itself.

Keep Standards High

My belief is that our industry's standards should always be higher than any that may be legislated. Beyond all doubt, the area in which standards of quality are most urgently needed and wanted is that of safety servicing. The facts of business life shows that this is so.

Best of all, you don't have to be a super-salesman to sell safety. There is work to be done . . . money to be made . . . and, most important, there are lives to be saved.

Information On Reprints Of The MOTOR AGE Training Program Available On Request

Sample Test:

Sept. 1961

MOTOR AGE Mechanics Training Course

BASIC ELECTRICITY

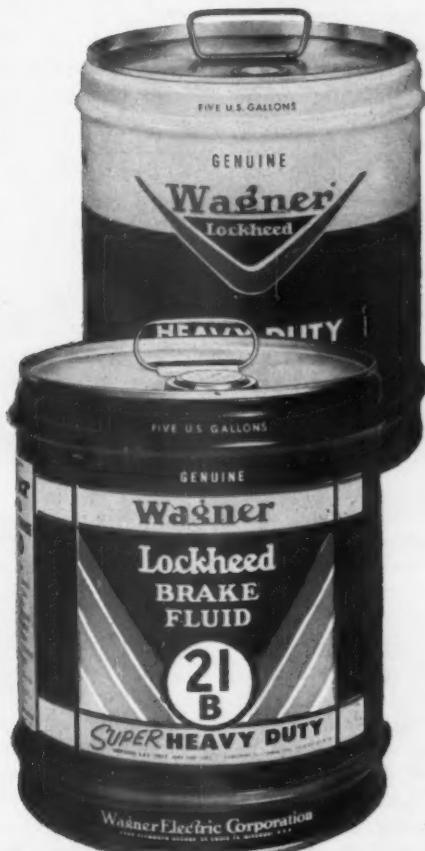
Test III

1. The term applied to the magnetic force always present in the generator pole pieces is:
 a. Electro-motive force b. Current flow c. Residual magnetism
2. What is the type of current produced in the armature coils before commutation?
 a. Free current b. Alternating current c. Direct current
3. A generator is a machine for converting:
 a. Mechanical energy to motion b. Mechanical energy to electrical
 c. Electrical energy to mechanical
4. Another name applied to a condenser is:
 a. Capacitor b. Transformer c. Coil
5. What is the induced voltage per turn of the secondary winding in the ignition coil?
 a. 21,000 volts b. 12 volts c. 1 volt
6. Which of the following is actually responsible for the induced voltage in the secondary winding of the ignition coil:
 a. Primary magnetic field collapse b. Secondary magnetic field collapse
 c. Condenser capacity
7. The generator commutator with its brush rigging is actually a:
 a. Field current regulator b. Automatic polarity reversing switch
 c. Automatic static eliminator
8. The electron collector foil plates of a condenser are made of:
 a. Thin wax treated paper b. Layers of fibre glass
 c. Aluminum or lead foil
9. Another name for the cut-out is:
 a. Reverse current relay b. Polarity reversing switch c. Overload relay
10. Duties of the generator circuit breaker is to:
 a. Disconnect the engine from the generator b. Connect the battery to the generator
 c. Disconnect the armature from the fields

WAGNER® LOCKHEED® . . . NUMBER ONE IN O.E.M. QUALITY FOR 37 YEARS

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Lockheed

BRAKE FLUID
THE QUALITY LINE
has special T.R.I.*.



*Protect your
customers with
the best and
safest brake fluid
on the market.*

***TEMPERATURE
RESISTANT
INGREDIENTS**

for proper functioning
under all operating
temperatures covering
a range from high-heat
to sub-zero.

UNSURPASSED FOR QUALITY . . . used by car and truck manufacturers (O.E.M.) for original equipment needs . . . there's none safer. FIRST in POPULARITY . . . FIRST in SALES in the brake service field — Wagner Lockheed Brake Fluid IS, and has been the No. 1 brand for 37 years . . . Surpasses S.A.E. specifications, meets State laws, and conforms to Federal specifications.

For details on this line of O.E.M. (Original Equipment Manufacturer) Quality—ask your Wagner Distributor . . . or write us for Bulletin HU-411.

Wagner Electric Corporation

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Manufacturers of **LOCKHEED® Products**

WASHO

Internal Combustion Engine . Continued from page 61

as basic mechanical parts and service are concerned. They both complete their series of combustion events in four strokes of the piston. They both ignite the fuel mixture by heat; the Otto engine uses the electric spark and the Diesel uses the heat of compression. However, in each case heat is used to ignite the fuel. If all this is so, where then does the difference show itself?

The basic difference is the process of combustion that each uses in its cycle. The Otto Cycle internal combustion engine uses what thermodynamists (heat conversion engineers) call "Constant Volume Combustion." The Diesel Cycle engine uses a process called "Constant Pressure Combustion." A brief explanation of the two processes follows:

Constant Volume Combustion

The Otto Cycle engine operates on the Constant Volume combustion principle; that is, theoretically, all combustion of the fuel air mixture takes place at constant volume (no change in the volume of the combustion space). Dr. Otto believed that the ignition of the fuel resulted in immediate explosion or combustion of the mixture without the volume increasing or decreasing in the combustion chamber. Today, we know that Dr. Otto didn't take time or piston speed into consideration. We know from tests that the spark ignites the fuel several degrees before top dead center; the particles of fuel closest to the spark plug ignite and this flame spreads from molecule of gasoline to molecule, supported in its combustion by the molecules of air in the mixture.

This flame progresses slowly across the combustion chamber while the piston is still moving up on the compression stroke. The timing of the spark is such that the peak combustion pressure is reached just as the piston starts over top dead center and heads downward for the power stroke. All this time the mixture has been burning and expanding as the combustion volume first decreased (piston moving up) then the volume increased as the piston moved down on the power stroke. All of this would take place in 1/300ths of a second

in a car traveling at 60 miles per hour.

The Otto Cycle functions on the principle of a premixed and properly proportioned quantity of fuel and air being admitted into the combustion chamber before the inlet valve is closed. This is one of the limiting factors in the power derived from this type engine. The amount of fuel and air is limited by the use of a carburetor as the metering and mixing device. No more fuel and air can be admitted after the intake valve closes. As a result the power impulse generated by the combustion of this trapped mixture is limited by the volume and the ratio of fuel-air mixture that can be compressed in the cylinder. This is limited also because a fuel air mixture will ignite due to the heat of compression. Generally a compression ratio of 12-1 is the maximum for the Otto cycle gasoline engine. The power delivered to the piston of the Otto Cycle engine can be easily compared to that of a sharp hammer blow in driving a nail. Once the hammer strikes the nail and expends its energy, no further movement of the nail occurs.

Constant Pressure Combustion

The Diesel Cycle of combustion operates on the principle of "Constant Pressure Combustion"; that is the combustion takes place at constant pressure with the volume of the combustion chamber changing. In the Diesel engine, air alone is drawn into the cylinder during the intake stroke. When the intake valve closes after bottom dead center and the piston starts the compression stroke, no fuel is present in the air being compressed. The air is compressed to from 16 or 20 to 1, at this point near top dead center, the temperature of the air reaches around 1000 degrees F. Dr. Rudolph Diesel's idea was to then inject raw fuel oil, under pressure, into this hot dense, highly compressed charge of air. Ignition of the fuel spray would immediately occur.

Because the Diesel takes in much more air than it ever needs to burn the fuel injected, it is said to have an over abundance of air (oxygen) in the burning process. This is the reason Diesel Exhaust is carbon di-

oxide and not as deadly as carbon monoxide of the Otto engines. The injected fuel in burning finds little difficulty in locating sufficient oxygen elements for satisfactory combustion. The big problem is that the injected fuel isn't as finely divided as the much lighter gasoline of the Otto engine. Being a relatively heavy fuel, it doesn't vaporize readily. Proper mixing of all the fuel injected is still a problem in the modern diesel engine.

As the fuel ignites and starts the burning process the combustion pressure raises to around 900 to 1000 pounds per square inch. As the piston moves on down the cylinder, forced to do so by the pressure of combustion, the injected fuel continues to burn and expand at approximately the same pressure. The amount of fuel injected can be regulated by the load controlled governor which regulates the amount of fuel depending on the load the engine is pulling. Current injector design allows for varying amounts of fuel and the variation of fuel injection periods. As an example, one unit is available that can vary the beginning and ending of the injection period. That is; it has a variable beginning and a variable ending. Others have a constant beginning and a variable ending. This allows the injectors to continue the injection of fuel into the hot air charge long after the piston has started down on the power stroke. This gives the result of applying constant combustion pressure on the piston for a greater length of time. Thus the phrase "Constant Pressure Combustion."

This process of combustion is the reason that a Diesel engine can pull a greater load than an Otto engine of the same horsepower. Because it has firing pressure on the working piston for a greater period of time, this means the engine develops a greater torque which isn't figured in horsepower calculations. In the baseball lingo, "it has a good follow-through." The Diesel, however, hasn't gained much headway in the light duty automotive vehicle. Many reasons have been advanced for this by automotive engineers from every country. Initial cost they say is too high, it takes much heavier structural members and parts to withstand the pressure of the Diesel. Objections have been raised as to

Continued on page 115

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LINED BRAKE SHOES
are contour ground
... easy to install



**Lined Shoes
save you time...
let you do
more jobs per day.**

As manufacturer of Lockheed Hydraulic Brakes, Air Brakes, and Liquid Cooled Disc Brakes made for O.E.M. (Original Equipment Manufacturer)—Wagner knows brakes. That's why Wagner lined brake shoe sets are contour-ground to save you time—compensate for normal drum distortion. HOW-TO-DO-IT installation instructions are included in each box. Lining also available in rolls, sets, blocks and slabs.

For details on this line of O.E.M. (Original Equipment Manufacturer) Quality—ask your Wagner Distributor . . . or write us for Catalog BU-579.

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Manufacturers of **LOCKHEED[®]** Products

WB-14

1961 New Passenger Car Registrations*

STATE	Buick	Cadil-lac	Chev- rolet	Chrysl- er	Comet	Dodge	Ford	Im- perial	Lin- coln	Mer- cury	Olds- mobile	Plym- outh	Pan- iac	Ramb- ler	Stude- baker	All Others		Total	
																U.S.	Foreign		
Alabama.....	265	99	1702	73	225	171	1443	8	11	108	277	284	271	341	35	1	417	5729	
8 Mos.	2244	763	14290	572	1512	1620	10905	71	171	794	2141	1928	2468	350	33	3516	45983		
Alaska.....	4	3	66	1	14	5	44	1	2	5	8	10	206	350	2	55	235		
8 Mos.	82	57	677	74	187	77	600	14	12	64	82	266	130	211	43	7	489	3072	
Arizona.....	88	42	740	38	187	113	871	6	20	64	117	133	128	227	22	1	196	2765	
8 Mos.	855	633	6302	301	1245	997	5171	46	181	575	1145	1276	1253	1886	442	13	1612	23833	
Arkansas.....	137	49	1027	41	113	95	953	2	7	58	164	132	167	217	15	-	-	3267	
8 Mos.	1113	526	8445	523	853	827	7037	32	69	547	1425	1087	1601	1446	228	29	1341	26945	
California.....	Aug.	1015	1256	10224	655	1796	1747	9960	82	396	963	2052	2016	2304	3307	425	122	5409	44580
8 Mos.	16101	11010	93065	4853	14446	14553	99353	748	4498	7907	16738	16960	21137	24645	4009	122	37389	378454	
Colorado.....	242	85	1610	87	158	201	1292	8	27	130	271	344	288	364	47	-	386	5482	
8 Mos.	1682	771	11373	649	1067	1456	9322	84	227	829	2030	2235	2220	2602	877	51	2456	39833	
Connecticut.....	Aug.	249	167	101	1808	415	311	1829	4	30	149	328	506	348	733	73	3	843	7894
8 Mos.	1901	1106	844	1229	2455	2006	10828	78	255	1620	2454	3008	2974	4267	1113	33	5392	52243	
Delaware.....	Aug.	82	37	416	81	407	22	47	12	42	47	68	96	84	7	-	114	1482	
8 Mos.	560	320	4132	176	277	556	3226	18	56	249	622	549	774	657	83	10	815	13078	
Dist. of Col.....	Aug.	106	57	725	75	78	94	581	5	8	56	126	175	132	155	26	8	239	2619
8 Mos.	728	525	8200	370	801	819	4335	34	164	408	1036	1494	1203	1001	657	40	1700	20315	
Florida.....	Aug.	635	403	3463	165	684	619	3929	41	101	205	648	856	763	985	106	4	1671	15360
8 Mos.	5803	4417	30978	1333	4864	4452	30356	345	962	2167	8098	6312	6714	7534	1196	87	14180	128054	
Georgia.....	Aug.	294	136	2174	76	313	243	2186	3	16	100	302	478	528	471	45	3	853	8291
8 Mos.	3063	1302	20045	792	2339	2200	19185	86	186	1104	3105	3717	5346	3029	729	77	7006	73334	
Hawaii.....	Aug.	86	6	334	74	86	445	8	13	74	177	74	81	5	-	199	1641		
8 Mos.	435	122	2900	166	327	363	2658	5	38	82	449	1218	609	464	80	4	1472	11182	
Idaho.....	Aug.	101	35	320	23	63	79	342	1	9	42	100	147	121	162	23	-	137	1705
8 Mos.	752	342	2885	226	461	646	2414	47	64	351	725	800	822	1207	267	9	1020	12927	
Illinois.....	Aug.	1554	709	8636	749	785	850	8279	43	147	630	1353	1403	1949	1905	196	57	1179	26273
8 Mos.	14747	7406	78362	4113	5708	8067	51540	527	1283	5410	17556	17546	15471	2495	656	10506	25204		
Indiana.....	Aug.	731	241	3621	184	317	582	3200	15	43	270	920	683	757	820	213	14	881	13772
8 Mos.	5632	2216	28630	1541	2082	4227	22481	173	414	2034	7023	4709	6648	5613	2247	181	4544	101003	
Iowa.....	Aug.	294	116	1613	88	183	317	1598	4	10	173	283	394	288	473	45	6	196	6037
8 Mos.	2566	855	15536	804	1280	2438	13043	51	105	1499	2704	2776	3095	3759	574	41	1626	16284	
Kansas.....	Aug.	351	96	2167	94	199	317	1741	8	12	163	364	412	321	428	49	7	419	7167
8 Mos.	3009	1016	16179	811	1302	2346	12312	84	186	1256	2972	2755	3067	2965	480	41	2570	53337	
Kentucky.....	Aug.	211	75	1202	51	113	132	1325	4	8	75	214	311	225	310	16	5	318	4625
8 Mos.	1925	624	11121	366	960	1147	9620	47	77	648	2126	2173	2193	2213	298	29	227	38035	
Louisiana.....	Aug.	246	114	2004	126	237	207	1788	10	21	128	434	254	321	383	44	2	304	6713
8 Mos.	1952	906	15009	856	1667	1492	13401	97	182	956	3079	1685	3080	3261	472	35	2862	50594	
Maine.....	Aug.	49	9	378	15	50	71	371	5	2	34	39	106	54	126	24	-	142	1477
8 Mos.	687	287	4836	255	619	863	4487	34	47	363	639	1067	966	1441	299	8	1843	18641	
Maryland.....	Aug.	351	153	2817	173	381	471	2547	7	30	182	430	791	420	891	73	8	564	10166
8 Mos.	2332	1274	23347	1283	2582	3371	18711	78	235	1266	3199	5093	3812	4589	838	4806	77350		
Massachusetts.....	Aug.	540	202	3166	226	513	585	3416	17	46	245	500	975	605	1496	147	14	960	13743
Michigan.....	Aug.	1545	868	6834	291	1256	993	7982	30	85	797	1205	1713	1673	182	124	10	1486	27561
8 Mos.	12433	5005	55739	2827	7869	7694	52501	328	1018	8139	1740	14409	1662	1326	168	126	9215	20724	
Minnesota.....	Aug.	394	211	1646	186	265	307	1872	10	19	213	604	576	374	634	73	1	498	8257
8 Mos.	3937	1474	21494	1427	1911	3060	16930	133	251	1933	5023	4623	4723	5256	1144	45	3770	77154	
Mississippi.....	Aug.	157	31	885	36	75	84	685	8	52	144	126	147	128	12	10	137	2714	
8 Mos.	1252	395	7492	274	618	589	5712	36	74	406	1367	1602	1352	1027	221	28	1422	23273	
Missouri.....	Aug.	446	163	3207	97	273	408	2429	8	28	166	575	528	531	564	44	6	798	10271
8 Mos.	4148	1909	29967	1024	2139	3801	22356	122	275	1833	4744	4542	5495	5049	773	107	4602	92746	
Montana.....	Aug.	121	32	454	42	70	126	500	4	8	70	117	89	98	157	24	1	137	2051
8 Mos.	824	310	3344	278	430	737	3180	38	58	405	892	826	754	1614	207	14	788	13679	
Nebraska.....	Aug.	154	42	1155	68	173	1057	1382	2	6	106	202	223	195	252	30	3	225	4018
8 Mos.	1409	606	514	671	1382	823	565	48	97	1788	1738	1935	1838	304	1635	3270			
Nevada.....	Aug.	15	24	106	7	17	26	120	3	12	34	32	50	42	6	-	46	540	
8 Mos.	153	263	1336	113	220	337	1279	28	71	186	328	376	577	447	108	14	671	6485	
New Hampshire.....	Aug.	57	29	525	75	78	94	416	2	8	46	55	106	75	177	27	1	244	1966
8 Mos.	619	286	4763	203	604	827	3541	18	61	341	566	660	787	1377	335	16	1917	16041	
New Jersey.....	Aug.	7788	5271	42821	4042	5153	6477	3806	422	361	3095	7536	9617	10378	12730	130	12625	166907	
8 Mos.	86	54	606	33	61	80	588	5	85	136	168	109	151	42	1	168	2330		
New York.....	Aug.	621	386	4390	242	440	563	3738	42	86	426	899	897	946	1160	443	10	1106	16415
Aug.	1989	1121	10456	846	1976	1767	10644	63	168	975	2024	3301	2200	3661	341	141	3881	45587	
8 Mos.	18744	22606	66801	8380	14172	16654	81356	805	1770	8619	2195	25771	24222	27445	4886	1706	29135	30528	
North Carolina.....	Aug.	444	117	17807	966	2058	2331	19043	77	161	262	345	401	262	3232	2207	284	10193	22366
8 Mos.	3646	117	2160	138	303	335	2736	9	22	166	419	608	456	468	49	2	521	1985	
North Dakota.....	Aug.	37	18	305	29	42	54	258	1	6	53	62	75	47	91	6	1	32	1119
8 Mos.	507	200	3213	283	334	594	2638	17	38	414	712	627	533	758	167	9	330	11342	
Ohio.....	Aug.	1388	401	725	139	118	703	48	84	707	1330								

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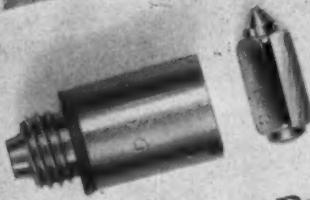
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Now—at no increase in price—Carter Zip-Kit Carburetor Repair Kits will contain the newly developed Carter needle-valve assembly with a resilient leak-proof valve-seat! The new "Super" Zip-Kit services all the popular makes of carburetors. So check your parts inventory today...and stock up on profit-building Carter Fuel system products.

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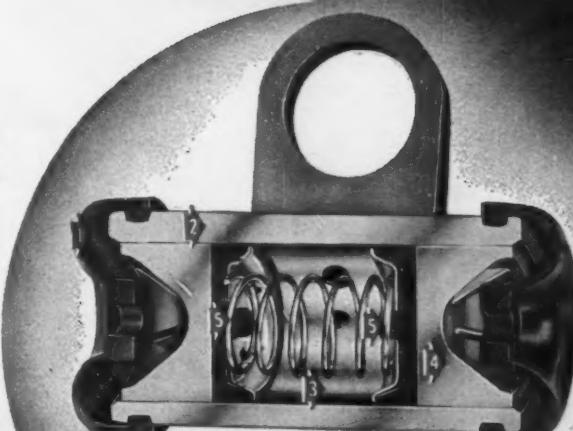
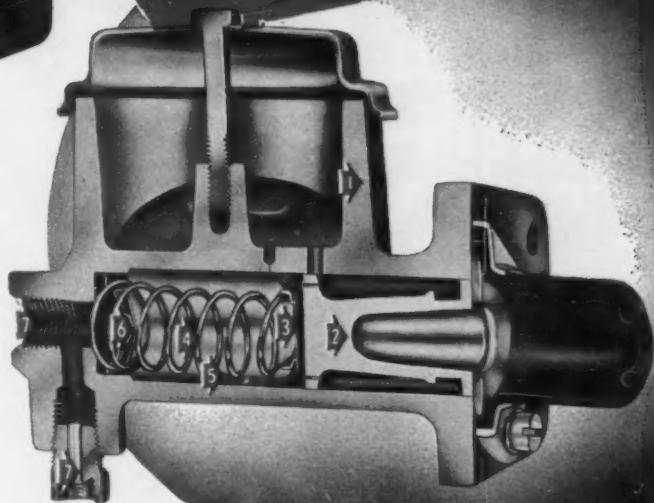
mighty
strong on built-in
completely-inspected
stop-qualities

MASTER CYLINDERS

- ① **CASTINGS:** Fine grain, semi-steel. Many are shell-moulded . . . all 100% pressure-tested!
- ② **PISTONS:** Precision-machined and ground. Fitted with EIS improved, ribbed, non-leak Secondary Cup!
- ③ **MAIN CUP:** MADE OF HEAT-RESISTANT COMPOUND. Designed with a razor-sharp sealing edge, moulded with tapered grooves to permit proper passage of fluid in the backstroke operation. Moulded-in brass ring protects cup from extruding into piston by-pass holes!
- ④ **SPRING:** Formed of top-quality music wire. Engineered to hold proper residual pressures to insure return of main cup and piston!
- ⑤ **BORE:** Bearingized and finished to close-precision tolerances for proper seal and lubrication!
- ⑥ **CHECK VALVE:** Precision steel stampings assembled with high grade rubber flapper . . . 100% pressure-tested. Only the latest types are used!
- ⑦ **OUTLET PORTS:** All are lead screw tapped to assure full, precision threads, leakproof construction and to prevent cross-threading!

WHEEL CYLINDERS

- ① **BOOTS:** Designed to prevent dirt from entering the cylinder and interference with piston action and cup seal
- ② **CASTING:** Moulded of fine grain semi-steel; machined to accurate tolerances. Many are shell-moulded!
- ③ **BORE:** Accurately finished to produce a correct hydraulic seal and to allow enough lubrication for longer cup life!
- ④ **PISTONS:** Precision-machined and ground. HEAT-TREATED for hardness to increase life and reduce scuffing!
- ⑤ **CUPS:** "E" Series HRC® Cups with Expanders and Springs insure trouble-free operation in high-heat conditions. The Expander applies the slight pressure needed at the point of seal to insure correct sealing and longer cylinder life; does not interfere with brake shoe return. "E" Series Cups with Expanders and Springs are built into all EIS Wheel Cylinders at no extra cost!



* HRC Heat-Resisting Compound,
Operates efficiently at -40° F., too!



MASTER CYLINDERS • WHEEL CYLINDERS
POWER BRAKE KITS • POWER BRAKE PARTS • HOSES • SWITCHES • BRAKE FLUIDS • BRAKE BLEEDERS
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UP TO 40% MORE ENGINE-KILLING SLUDGE IS TRAPPED!

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FRAM

"WEAR-GUARD" FILTERS

Don't Push The Panic Button . *Continued from page 51*

This new pre-packed bearing became possible in the last few years through these technical developments:

1. Better specialized lubricants of the type needed.

2. Better seals.

3. New type plastic bearings.

This type of pre-packed bearing is used primarily on the steering linkage and on the ball joint suspension.

Again—strictly speaking—these are not "lubeless" cars because the new type bearings are pre-packed with a specialized type of lubricant.

With the foregoing facts in mind, let's ask a few questions:

Question: Have all lubrication points been eliminated?

The answer is—no. Only 8 to 11 of a total of 40 lubrication points on the average automobile have been eliminated. Many or all of the other lubrication points will continue to need attention and service. Unquestionably, the 8 or so most critical points of lubrication—the points the car owner had to have serviced at regular intervals—definitely have been eliminated.

Question: How many lubeless cars are on the road now?

In other words, is the impact of this new development yet to reach the service station or car dealer level?

Only four standard makes and models marketed in 1961 were of the fittingless variety. At this stage of

**See Upcoming Features
On Page 134**

the year, we can only estimate or project what their sales will be but it appears now that these 4 makes by the end of this year will sell approximately 1,425,000 cars which would be approximately 25.9% of the total 1961 new car production. Frankly, this looks like a very alarming picture when you consider that many automobiles theoretically will not have to visit a

lubrication bay for a long, long time.

Question: How soon will chassis lubrication be obsolete?

If one wonders whether the end of the lubrication business isn't just around the corner, don't forget the 25.9% of 1961 cars of the fittingless variety are only a small fraction of the total number of cars on the road. If our projected

figure holds up, at the end of 1961 only a little over 2% of the cars on the road will be of the fittingless variety.

All the millions of other cars on the road will continue to need lubrication service and even though it may be a diminishing market, it will be at least 15 years or more before all cars have disappeared that require lubrication attention. You can see this point quickly by considering the total number of cars on the road by year, going back to 1941 and beyond. Total

Continued on page 128

Radiator Servicing Profits Now Greater Than Ever with



3 ESSENTIAL UNITS COMBINED INTO 1

Inland's newest unit makes radiator servicing more profitable than ever. Reduces your initial cost by combining the Flo-Test Machine, Hot Cleaning Vat and Test & Repair Bench into one complete radiator department. Enables you to do the entire Testing, Cleaning and Repairing job. Compact. Saves steps.

LESS SPACE REQUIRED! Complete unit is only 11' 7" long, 3' 6" wide.

LARGE CAPACITY! Handles all car, and many truck and tractor radiators.

VAT FEATURES! Solution agitator speeds radiator cleaning. Automatic Timer turns heat OFF at closing time, turns it ON at any pre-determined hour so solution is hot when you arrive for

work. Even turns it off-on week ends.

OPERATING COST IS LESS! A full time operator is not needed. One of your present employees, in only a part of his time, will produce good additional profits with no increase in overhead.

WE TRAIN YOUR OPERATOR! Our free factory school quickly makes your man a professional radiator repairman.

BIG PROFITS SERVICING RADIATORS! Users report: "\$900 first 30 days!" (Ills.) "\$4,500 in 6 months!" (Pa.) "\$18,000 first 9 months!" (Cal.) The market is growing. Many radiators need cleaning. The hourly return is high. Inland's national advertising helps you.

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Shows equipment, prices, training course, Pay-For-Itself purchase plan and experiences of other operators.

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ADDRESS _____

CITY _____ ZONE _____ STATE _____

BY _____ TITLE _____

If dealer, make of car sold.
Are you now operating a Radiator Dept.? Yes No



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Ventilated Points and 94
other Holley Carburetion
and Ignition items . . .**

. . . but when you insist
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Original Equipment Quality!

Let's face it . . . anything that is good is bound to be copied. Take Holley Ventilated Contact Sets, for example. When Holley engineers developed and perfected the ventilated principle, it was natural that others would duplicate this important contribution to ignition efficiency. Yes, you can buy copies of Holley Contact Sets and many other carburetion and ignition products, but it makes sense to replace with Holley components that are built to *original equipment quality* specifications, and are as much *originals* as the parts they replace. That way you're *sure* of customer satisfaction.



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Manufacturers of
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MOTOR AGE • November 1961

1962 PASSENGER CAR PRICE, WEIGHT AND BODY TABLE

The Suggested Retail Price is for cars with standard equipment and includes Federal excise taxes and preparation and conditioning charges. Transportation charges, state or local taxes, finance charges, and optional equipment are extra.

MAKE MODEL AND BODY TYPE	Suggested Retail Price	Wheelbase (in.)	Shipping Weight (lb.)	MAKE, MODEL AND BODY TYPE	Suggested Retail Price	Wheelbase (in.)	Shipping Weight (lb.)	MAKE, MODEL AND BODY TYPE	Suggested Retail Price	Wheelbase (in.)	Shipping Weight (lb.)	MAKE, MODEL AND BODY TYPE	Suggested Retail Price	Wheelbase (in.)	Shipping Weight (lb.)				
AMERICAN MOTORS CORP.																			
RAMBLER				CHRYSLER CORP., DODGE, cont'd				FORD MOTOR CO., cont'd				GENERAL MOTORS CORP., BUICK, cont'd			GENERAL MOTORS CORP., CHEVROLET, cont'd				
American 6				Lancer GT Hardtop, 2d.	2237	106.5	2595	Fairlane 8				Sta. Wag., 3d.	2736	112	2896	Corvette Convertible.....	4038	102	2905
DeLuxe				Dart 8t Hardtop, 2d.	2237	106.5	2595					Spec. Del. 8 Sedan, 4d.	2593	112	2648	Oldsmobile F-88			
Sedan, 2d.	1846	100	2480	Dart 8t Sedan, 2d.	2313	116	3110					Convertible.....	2879	112	2820	Cli. Coupe.....	2403	112	2607
Sedan, 4d.	1895	100	2500	Sedan, 2d.	2360	116	3155					Sta. Wag., 2s.	2890	112	2845	Sedan, 4d.	2457	112	2599
Sta. Wag., 2d.	2081	100	2555	Sedan, 4d.	2716	116	3455	Fairlane 500-8				Skylark Spt. Coupe.....	2787	112	2707	Del. Sed. 4d.	2592	112	2634
Sta. Wag., 4d.	2130	100	2573	Sta. Wag., 2s.	2716	116	3455					Le Sabre Sedan, 2d.	3081	123	4041	Cutl. Cpe.	2694	112	2651
Custom				Dart 8-330t Sedan, 2d.	2447	116	3125					Sedan, 4d.	3227	123	4104	Sta. Wag., 2s.	2754	112	2780
Sedan, 2d.	1929	100	2492	Sedan, 4d.	2505	116	3170					Spt. Coupe.....	3293	123	4054	Sta. Wag., 3s.	2835	123	2882
Sedan, 4d.	1956	100	2512	Hardtop, 2d.	2535	116	3160					Hardtop, 2d.	3369	123	4156	Del. Wag., 2s.	2889	112	2812
Sta. Wag., 2d.	2141	100	2565	Sta. Wag., 2s.	2813	116	3465					Cutl. Conv.	2971	112	2830	Cutl. Conv.			
Sta. Wag., 4d.	2190	100	2600	Sta. Wag., 3s.	2914	116	3355												
400				Dart 8-440t Sedan, 2d.	2447	116	3125												
Sedan, 2d.	2040	100	2558	Sedan, 4d.	2656	116	3195												
Sedan, 4d.	2089	100	2585	500-V8 Hardtop, 2d.	2722	119	3587												
Sta. Wag., 4d.	2320	100	2692	Hardtop, 2d.	2768	116	3185												
Convertible.	2344	100	2735	Hardtop, 4d.	2728	116	3210												
Classic 6				Convertible.	2910	116	3480												
DeLuxe				Sta. Wag., 2s.	2854	116	3480												
Sedan, 2d.	2000	108	2866	Sta. Wag., 3s.	3057	116	3550												
Sedan, 4d.	2050	108	2888	Polaris 8t Hardtop, 2d.	2984	116	3300												
Sta. Wag., 4d.	2380	108	3014	Convertible.	3233	116	3350												
Custom																			
Sedan, 2d.	2150	108	2876	500XL-V8															
Sedan, 4d.	2200	108	2888	Ranch Wag., 6p.	2942	119	4016												
Sta. Wag., 4d.	2492	108	3024	Ctry. Sedan, 6p.	2938	119	4039												
Sta. Wag., 5d.	2614	108	3094	Ctry. Sedan, 8p.	3042	119	4057												
400				Ctry. Sedan, 8p.	3127	119	4053												
Sedan, 2d.	2299	108	2841	Ctry. Sedan, 9p.	3197	119	4070												
Sedan, 4d.	2349	108	2853	THUNDERBIRD															
Sta. Wag., 4d.	2640	108	2955	Hardtop, 2d.	4321	113.2	4132												
Ambass. V-8				Landau, 2d.	4398	113.2	4144												
Custom				Convertible, 2d.	4788	113.2	4370												
Sedan, 4d.	2454	108	3259	Spt. Road., 2d.	5439	113.2	4471												
Sta. Wag., 4d.	2760	108	3385																
400																			
Sedan, 4d.	2605	108	3283	PLYMOUTH															
Sta. Wag., 4d.	2901	108	3408	Valiant															
Sta. Wag., 8d.	3023	108	3471	V-100															
CHEQUER MOTORS				Sedan, 4d.	1930	106.5	2460												
Superba				Convertible.	1991	106.5	2500												
Sedan, 4d.	2542	120	3320	Sedan, 4d.	2076	116	2495												
Sta. Wag., 4d.	2896	120	3570	700															
Marathon				Sedan, 2d.	2087	116	2520												
Sedan, 4d.	2550	120	3345	Sedan, 4d.	2139	114	2515												
Sta. Wag., 4d.	3004	120	3615	Sedan, 4d.	2381	106.5	2700												
CHRYSLER CORP.				Sedan, 4d.	2285	106.5	2880												
CHRYSLER				Signet 200															
Newport				Hardtop, 2d.	2230	106.5	2565												
Sedan, 4d.	2964	122	3705	Comet-Cust. 6															
Belvedere 8t				Sedan, 2d.	2450	116	3115												
Sedan, 2d.	3027	122	3720	Meteor-Std. 8															
Hardtop, 4d.	3106	122	3735	Sedan, 2d.	2507	116	3150												
Convertible.	3399	122	3780	Sedan, 4d.	2538	116	3145												
Sta. Wag., 2s.	3478	122	4125	Sedan, 2d.	2815	116	3450												
Sta. Wag., 3s.	3566	122	4185	Sedan, 4d.	2917	116	3520												
300				Fury 8t															
Hardtop, 2d.	3323	122	3765	Sedan, 4d.	2670	116	3165												
Hardtop, 4d.	3400	122	3810	Sedan, 4d.	2893	116	3150												
Convertible.	3883	122	3880	Monterey 8t															
New Yorker				Sedan, 2d.	2742	116	3180												
Sedan, 4d.	4125	126	3950	Sedan, 4d.	2781	120	3748												
Hardtop, 4d.	4263	126	3970	Sedan, 4d.	2835	116	3825												
Sta. Wag., 2s.	4768	126	4235	Sedan, 4d.	2842	120	3765												
Sta. Wag., 3s.	4873	126	4385	Hardtop, 4d.	2907	120	3841												
300H				Commuter, 6p.	3029	120	3829												
Hardtop, 2d.	122	4050		Custom-8t															
Convertible.	122	4105		Sedan, 4d.	2965	120	3838												
DODGE				Hardtop, 2d.	2972	120	3774												
Lancer 170				Hardtop, 4d.	3037	120	3853												
Sedan, 2d.	1831	106.5	2520	Commuter, 6p.	3222	120	3940												
Sedan, 4d.	1991	106	5253																
Sta. Wag., 2s.	2286	106	52715																
Lancer 770																			
Sedan, 2d.	2032	106	52535	BUICK															
Sedan, 4d.	2094	106	52550																
Sta. Wag., 2s.	2388	106	52730																
DeLuxe 8																			
Sedan, 2d.	2071	109.5	2282	Special 8															
Sedan, 4d.	2133	109.5	2319	Coupe.....	2304	112	2638												
Futura.....	2232	109.5	2347	Sedan, 4d.	2358	112	2666												
Sta. Wag., 2d.	2384	109.5	2584	Sedan, 4d.	2358	112	2666												
Sta. Wag., 4d.	2427	109.5	2621	Convertible.....	2587	112	2858												
Squaile.....	2603	109.5	2633	Sta. Wag., 2s.	2655	112	2678												
300H																			
Hardtop, 2d.	122	4050																	
Convertible.	122	4105																	
DODGE																			
Lancer 170																			
Sedan, 2d.	1831	106.5	2520																
Sedan, 4d.	1991	106	5253																
Sta. Wag., 2s.	2286	106	52715																
Lancer 770																			
Sedan, 2d.	2032	106	52535				</												

Get the Extra Power, Performance

SIOUX *AIR OR
ELECTRIC*

NO. 330

NO. 313

NO. 325

The new H.D. 1" No. 482 Air Impact Wrench, the mighty big one, is intended for the kind of jobs that tear up ordinary 1" wrenches.

SIOUX Air Impact Wrenches deliver up to 15% more torque while consuming 30% less air!

SIOUX Electric Impact Wrenches such as the No. 330 illustrated, deliver the extra measure of efficiency, performance and freedom from trouble you expect from SIOUX.

Use **SIOUX**

....and Long Life of

IMPACT WRENCHES!



NO. 322



NO. 482



NO. 270

WHEN IT'S A SIOUX YOU KNOW WHAT IT WILL DO—
SIOUX tells you the torque your air or electric impact
wrench will deliver. Don't buy just a wrench. Buy cer-
tified SIOUX power!

The No. 270 SIOUX Slugger is an all purpose metal
working tool. It cuts metal, breaks spot welds, splits
nuts, shears bolts, punches out pins, and scrapes
metal clean.

....all the way through!

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Sioux City, Iowa, U.S.A.

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Scarborough, Toronto, Ont.

SOLD THROUGH DISTRIBUTORS IN U.S., CANADA AND
OVERSEAS. FIND YOUR NEAREST U.S. DISTRIBUTOR
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▲ AIR & ELECTRIC IMPACT WRENCHES • DRILLS
• SCREWDRIVERS • NUT RUNNERS • SANDERS
• GRINDERS ▲ ELECTRIC POLISHERS • FLEXIBLE
SHAFTS • PORTABLE SAWS • VALVE GRINDING MA-
CHINES ▲ ABRASIVE DISCS

Chevy's First 50 Years *Continued from page 41*

to keep its place at the industrial board, Durant was expanding the company's manufacturing and sales horizons. A believer in the economy of branch plants, he made profit-sharing agreements with going factories in St. Louis, Oakland, Cal. and in Canada. He acquired additional facilities in New York, Tarrytown and Toledo. New motor, axle and assembly plants were erected at Flint. He established factory sales offices at many points.

If the expansion program indicated Durant's foresight, his stock transactions proved his financial genius. Though proxies, personal acquisitions and other moves, he was during this period rapidly regaining control of General Motors. Late in 1916 he moved into the presidency of the corporation. Some historians say Chevrolet "absorbed" General Motors. A happier explanation would be that the two companies "merged."

Having joined an automotive family that was destined for world renown, it might be assumed that Chevrolet's future was now secure. It didn't work out that way. Durant left the corporation in late 1920 and a postwar slump hit all car sales with particular damage to Chevrolet. Volume in 1921 dropped 50 per cent and for the only year in corporate history Chevrolet did not rank as GM's biggest producer.

The severe decline in the automobile market brought repercussions. GM assigned a firm of industrial experts to look over its operations. The "doctors" questioned whether the corporation should stay in the low-price market and recommended surgery. They urged that Chevrolet be dropped!

The official most credited with blocking this step was A. P. Sloan, Jr. vice president in charge of operations at the time, later the corporation's president and chairman of the board. He counseled that not only should the car be retained, but that it should be given tougher competitive muscles. Prices were slashed to make Chevrolets the lowest cost full-sized automobiles.

As a result of these policies and many engineering and manufacturing advances, Chevrolet began to

expand at a remarkable rate. Production for 1922 more than tripled that of 1921, and by 1927 Chevrolet took the top spot for the first time in history.

Although the depression years created severe economic hardships throughout the country, Chevrolet continued to expand throughout the '30s and up to World War II. From 1935 to the start of World War II annual production exceeded one million units.

With the exception of one facility used to supply maintenance parts, all Chevrolet plants were completely converted to the war effort during World War II. Military items included aluminum forgings, magnesium and gray iron castings, Pratt & Whitney engines, artillery weapons, shells, and many military cars and trucks.

In the years following World War II Chevrolet's network of manufacturing facilities continued to grow, reaching east and west from coast to coast and north and south from Michigan to Georgia. Sales and distribution matched the growth. In 1950 Chevrolet broke all previous industrial records for auto production. This was also the year the company's Powerglide automatic transmission made its debut.

The 1950 production record stood until 1955 when Chevrolet set a still higher mark for overall production and passenger car sales. The car had advanced features including a completely new V8 engine. Output crossed two million units, an all-time high for the auto industry. Chevrolet was also commended in this year for having produced nearly 60 per cent of General Motors Corporation's first 50 million cars.

Chevrolet dedicated a new multi-million dollar Engineering Center in the community of Warren, north of Detroit, in 1956. With the largest engineering facilities under one roof of any automotive manufacturer in the world, the new center is equipped to continue Chevrolet's list of engineering "firsts."

A few of the "firsts" in Chevrolet's field include valve-in-head engine, knee action, unisteel body, bonded brake linings, automatic

Continued on page 127

Service Managers' Notebook

Fuel Pump Test On The Piston Booster Type

The Carter fuel and booster pump used on American Motors cars, contains a metal piston with an "O" ring seal in the vacuum booster section. This piston arrangement and the "O" ring greatly improve the efficiency of the vacuum side of the pump. Some service men have been complaining of finding oil in the vacuum side of the pump and assume that the pump is defective.

Proper Lubrication

This type of positive vacuum booster pump requires a metered amount of oil for proper lubrication; therefore, the presence of oil on both sides of the piston and in the connecting hose is normal and does not necessarily indicate a defective pump.

On The Car Test

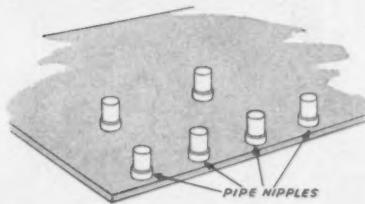
For a quick on-the-car test, the following procedure is recommended by the manufacturer:

1. Disconnect both lines (manifold and windshield wiper) at booster pump.
2. Hook up a vacuum gauge to the booster inlet (windshield wiper side).
3. Operate the engine at 800 to 1000 r.p.m. and note the vacuum gauge reading. A vacuum reading of 14" to 19" Hg. is normal. The pump should not be removed for oil pumping or poor wiper operation, as this test indicates the piston ring and valves in the pump are in satisfactory condition. A vacuum reading higher than 19" Hg. or lower than 14" Hg. indicates a pump deficiency which could be the cause of excessive oil consumption or poor wiper operation.

TIPS FOR THE BODY SHOP

Welding Tables Protected By Installing Pipe Nipples

When using our torch to cut material on the welding table,



eventually the table gets so damaged as to require replacement. We avoid this damage by tack welding a few halves of pipe couplings on top of the table at strategic places. Comes time to burn a piece of body or chassis steel, we screw in two or three 4-inch-high nipples into the coupling halves, then lay the material atop the nipples. This saves the table, and when nipples get too badly cut by the torch, they're replaced with others. *E. Mayover, 1601—14th St., West, (U.S. 41), Bradenton, Florida.*

Headliner Flock Gun Helps Uncover Dust Leaks

I have found what we think is a very good way to find dust leaks. We take an old headliner flock gun and put flour in it and then shoot it at the seams of the car body. The flour is the right weight to leave tell-tale traces where dust would come in. This system is very effective on station wagon rear windows. *Kenneth Still, Bagley Sales & Service, Box 464, Roseville, Illinois.*

to be repainted, we spray or "splatter" a small amount of very thin primer over the area we want to sand. We then sand only until the primer is all removed and we know we have completely sanded the surface. The boys never have to ask "is this good enough?" anymore. *Chas. M. Smith, R.R. 4 (Millville), New Castle, Ind.*

Filling In With Putty

When building up low spots with glazing putty on contoured surfaces a piece of rubber $\frac{1}{8} \times 2 \times 3$ inch does a much better job than anything we have tried. *Robert C. Worley, Route 3, Florence, Ala.*

Liquid Soap Keeps Weld Spatter From Finished Surfaces

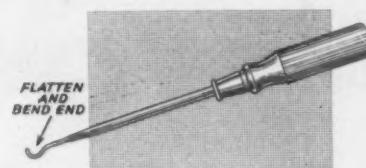
Avoid weld spatter on finished surfaces when welding panels, etc., by generously spreading over adjacent areas the same liquid soap you keep in the wash rooms. The soap keeps the spatter from sticking to the metal—also it brushes off easily after welding and leaves no scars to be refinished. *E. Mayover, 1601—14th St., West, (U.S. 41), Bradenton, Florida.*

Using Beer Can Opener To Remove Emblems

Using a beer can opener in removal of emblems and letters prevents breaking. The curved ends give leverage and makes for a handy grasp. *Harold L. Stanton, 32 Collier St., Binghamton, N.Y.*

Handy Tool Installs Chrome Moldings

Here is something that helps a lot on installing chrome mold-



ings around the windshield and rear windows, especially when your molding has a lip that must enter in the rubber. Sometimes the corners are tough and if pounded on may kink or bend. I took an old screw driver and flattened the end very thin then bent it as in the drawing. When the lip of the rubber doubles over I just insert tool back a little and then draw it past the spot where the trouble is and the molding slips right in. *James G. Cricks, 118 W. Tamarack St., Ironwood, Michigan.*

Idea For Producing Better Paint Jobs

We have an idea we use in our shop that we believe produces a better paint job and saves time too. Before we sand the surface

BODY SHOP TIPS

are worth

\$10.00

If you've developed an idea that has helped you to do body and fender work or painting better or faster, it may be worth money. Jot down the idea and, if necessary, make a rough sketch. Sometimes a snapshot will help. Just make the description of your BODY SHOP TIP clear, and if it is used, you'll receive a check for \$10.00.



UNITED DELCO? WHAT'S IN IT FOR ME?

simply say Delco

AND POWERFUL UNITED DELCO ADVERTISING HELPS YOU SELL!

When you simply say Delco you're identified by hard-hitting advertising that ties in directly with your own point-of-sale merchandising material from Delco . . . pulling in more customers for more business. This advertising goes to work for you everywhere! In Magazines: Look, Reader's Digest, and Post . . . CBS TV with the National Football League Game of the Week, and the big bowl games . . . NBC Radio with network "News on the Hour," "News of the World," "Emphasis," "Monitor" . . . On Billboards where people are constantly reminded to simply say Delco.

■ DELCO ADVERTISING WORKS FOR YOU EVERYWHERE . . . wherever they go, car owners in your neighborhood can't miss being reminded of the service you offer and the UNITED DELCO LINES you handle . . .

all famous products, manufactured by many General Motors Divisions and distributed through United Delco: Delco Remy Electrical System Parts • Delco Batteries • Delco Rochester Carburetors, Repair Kits and Chemicals • Delco Packard Wire and Cable • Delco Products Shock Absorbers • Delco Harrison Thermostats • Delco Hyatt Bearings • Delco New Departure Bearings • Delco Guide Automotive Lamps and Lamp Parts • Delco Moraine Brake Fluid and Brake Parts • Delco Appliance Windshield Wiper Systems, Heater, Defroster and Accessory Motors • Delco Radio Automotive Radios and Electro-Mechanical Devices • AC Service Parts • Hydra-Matic Transmissions. And Delco backing includes more:

■ FREE SERVICE TRAINING for you and your employees through your United Delco supplier . . . practical, scientific schooling at a nearby GM Training Center.



- UNITED DELCO CABINETS to fit your needs . . . with well organized drawers and shelves, clearly marked for efficient parts storage.
- DELCO INVENTORY CONTROL CARDS checked periodically by your United Delco supplier. These cards come

with your cabinets, help simplify every inventory problem.
■ DELCO CATALOG INFORMATION makes your job easier . . . cuts guesswork with the latest application information. Call your United Delco supplier and find out what's in it for you from **United Delco**.

UNITED MOTORS SERVICE, Division of General Motors



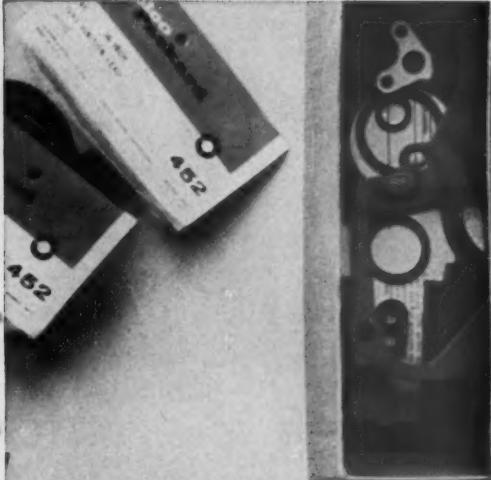


WANT TO TUNE UP MORE CARS WITH FEWER

simply say Delco



Delco Remy and Delco Rochester and Delco Packard. Put this popular team of Delco parts up-front in your modern Tune-Up Center . . . and watch your inventory and overhead problems melt before a sunnier profit picture. Why? Because Delco Remy Ignition Parts, Delco Rochester Carburetor OK Kits and Delco Packard Ignition Leads are fast turnover items. ■ Delco is a brand name that customers know and trust. And these quality lines are long on coverage, short on inventory. Take, for example, just 16 Delco Remy contact sets. That's all you need to service 97% of all cars registered. For a quick, quality carburetor tune-up of popular U.S. cars and trucks Delco Rochester Carburetor OK Kits fill the bill with gaskets, needle and seats, pump plungers. It's the same story with the new Delco Packard individual ignition leads. From only 12 TVRS leads or seven 440 copper core cable leads, you give service coverage to nearly all American cars. ■ The United Delco tune-up "Pattern For Profits" has this whole money-making story . . . efficient coverage, impressive



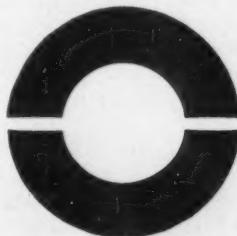
Delco  **Rochester**

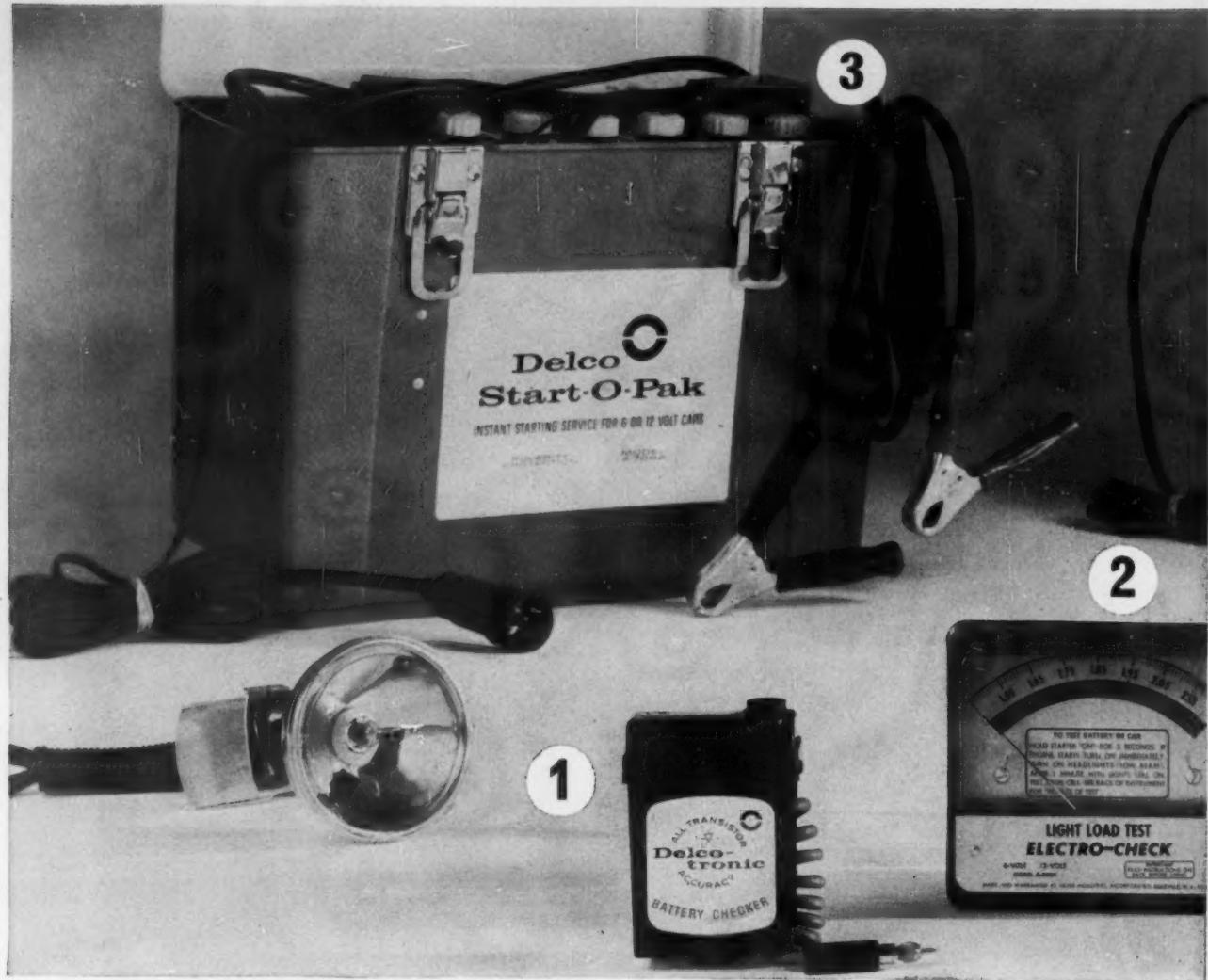


PARTS FROM A SINGLE QUALITY SOURCE?

advertising, training, application and service information. Ask your United Delco Supplier for details. ■ Better yet, take 15 minutes and let him show you the substantial profit opportunity you have in the tune-up business when you simply say Delco. **Delco Remy** Electrical and Ignition Parts, the complete line of **Delco Rochester** carburetor service and replacement parts, and **Delco Packard** Ignition Leads are distributed nationally through **United Delco**.

UNITED DELCO, Products of General Motors





simply say Delco

AND BUILD BIGGER BATTERY BUSINESS WITH 4 BIG BONUS PACKAGES



set for road service calls with the new, improved Delco Start-O-Pak. Check the four Delco Battery Winter Promotion Packages in this ad . . . then ask your Delco Battery supplier for details.

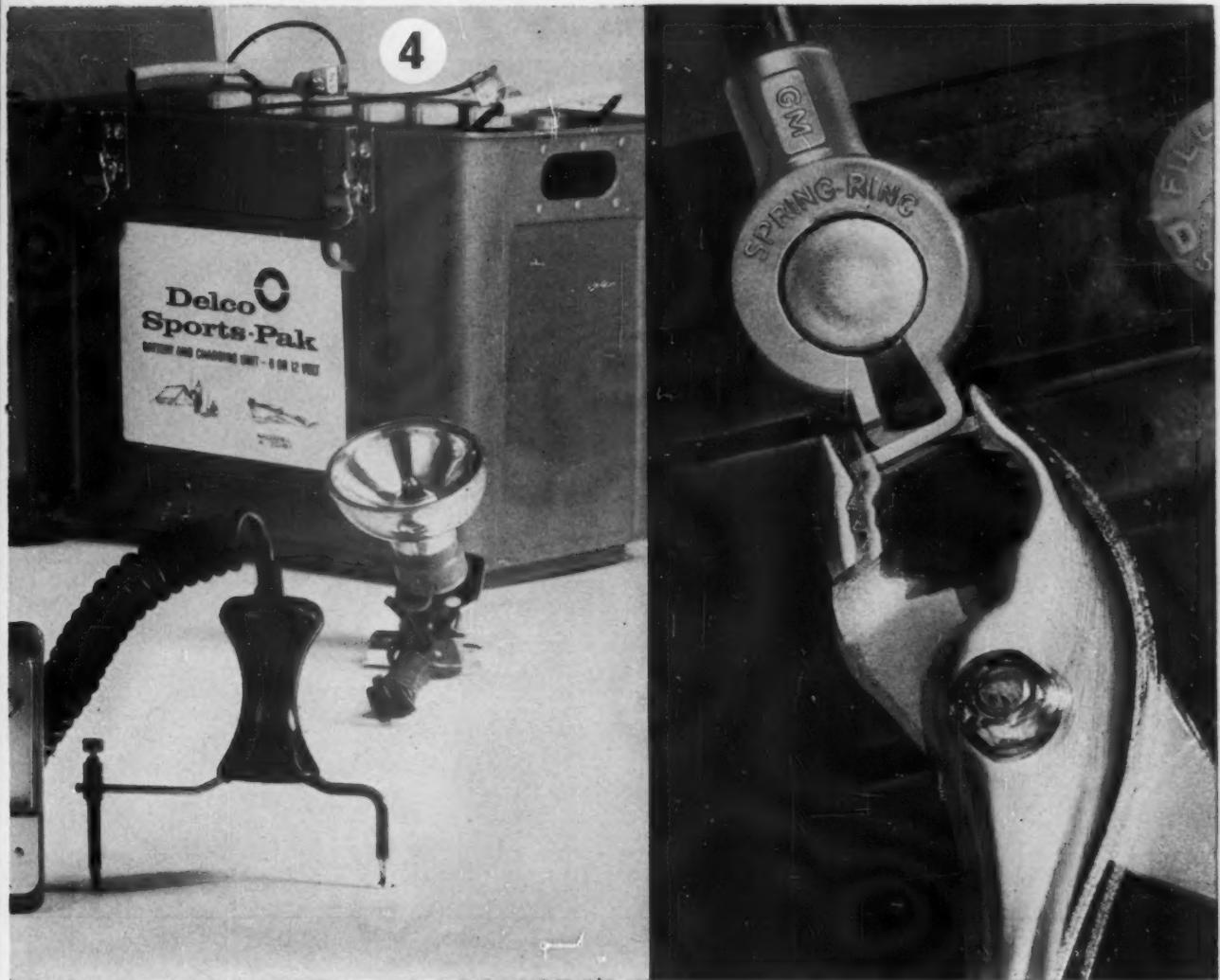
1. DELCO-TRONIC BONUS PACKAGE. Right now many Delco Battery wholesalers are offering the new pocket size, fully transistorized Delco-tronic Battery Checker at a special low price with a qualifying order of Delco Batteries. With the Delco-tronic you can check batteries faster than you check the oil.

2. ELECTRO-CHECK BONUS PACKAGE. Natural partner to the Delco-tronic Checker, this light load

tester tells you whether the battery should be replaced or recharged. Spot 'em with the Delco-tronic—test 'em with your Electro-Check meter and watch your battery charging, battery sales profits climb. Like the Delco-tronic Checker, the Electro-Check meter is being offered by many Delco Battery wholesalers now at a real saving with a qualifying order of Delco batteries.

3. START-O-PAK BONUS PACKAGE. Here's the perfect partner for road service calls or starting the tough ones that get pushed into your driveway. The new Delco Start-O-Pak has built-in polarity protection, built-in charger, spotlight and safety remote switch. The Start-O-Pak is being offered by many Delco Battery suppliers at bargain prices with a qualifying order of Delco Batteries.

4. SPORTS PAK BONUS PACKAGE. The new Delco Sports Pak provides portable power for campers, boatmen . . . and a wide variety of farm or indus-



-NET BIGGER PROFIT PER SALE WITH SPRING-RING BATTERY CABLE

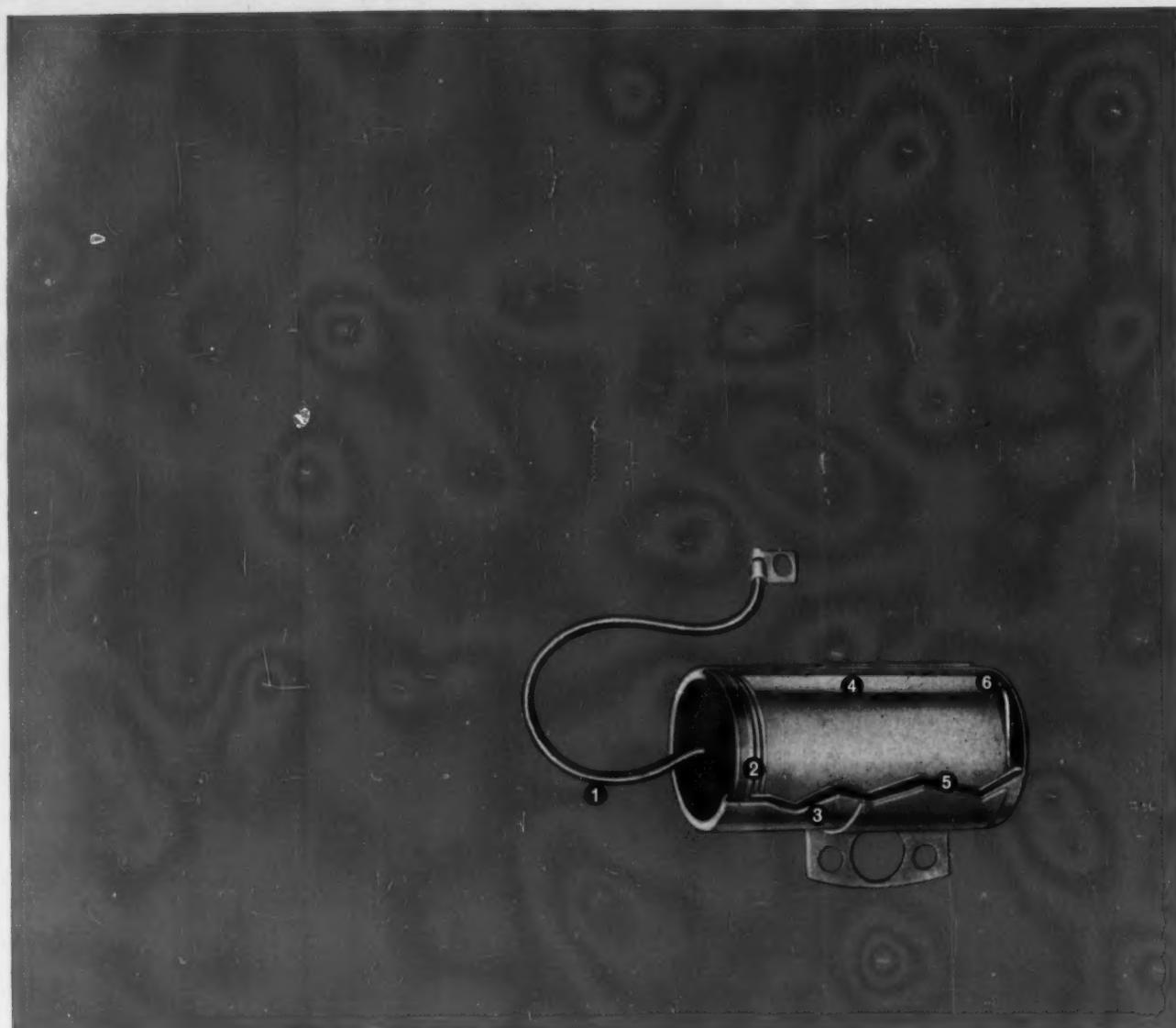
trial needs. Get it now at a special price from most Delco Battery suppliers when you buy a qualifying order of fast-moving Delco batteries. The Sports Pak includes a plug-in light with 6-foot cable, a built-in charger and comes in a new corrosion-resistant plastic case.

AND, you can win one of 58 trips to the NASCAR Races at Daytona Beach. Attend one of the service clinics being sponsored by many Delco Battery wholesalers and you're eligible to enter the contest. **Delco Batteries** are distributed nationally through **United Delco**.

DELCO PACKARD SPRING-RING battery cables mean more profit for you on battery sales. All it takes is two more seconds to check the cable when you check a battery. And two seconds plus a pair of pliers is all it takes to connect SPRING-RING terminal. Just squeeze the tangs and it's on. Squeeze again, and it's off. The SPRING-RING terminal is universally designed for both positive and negative posts. SPRING-RING battery cables are original equipment for all General Motors divisions. **Delco Packard** automotive wiring is distributed nationally through **United Delco**.

UNITED MOTORS SERVICE, Division of General Motors





WANT CONDENSERS THAT KEEP YOUR CUSTOMERS FROM SEEING RED?

simply say Delco

It's the quick, easy way to get the condenser that best meets your customer's needs—there's a Delco Remy condenser made for every popular American car and light truck. Precision balanced to match the rest of the ignition system, Delco Remy condensers assure correct electrical capacity, provide maximum contact point life and resist voltage breakdown. A hermetic seal keeps out harmful moisture, oil and vapors. Spring-loaded internal electrical connections to winding are vibration-proof. Your customers get more dependable operation—you get more repeat business plus maximum protection against "comebacks."

- 1 PLASTIC CABLE insulation
- 2 HERMETIC seal
- 3 STRONG STEEL container
- 4 WINDING impregnated under vacuum
- 5 EXTRA THICK premium insulation
- 6 SPRING-LOADED connector

Delco Remy condensers, like all Delco Remy quality-built electrical system components, are available at leading car and truck dealers and through **United Delco**



DELCO-REMY • Division of General Motors • Anderson, Indiana

Midland Ross Power Brake . . . Continued from page 71

plunger guides from the control valve plunger. Then remove the retainer that holds the reaction load ring and atmospheric valve on the control valve hub. Slide the reaction load ring and the atmospheric valve from the control valve hub. Separate the control valve hub and the plunger assembly from the diaphragm by sliding the plunger and rear seal adapter from the rear of the hub. Then remove the hub outer

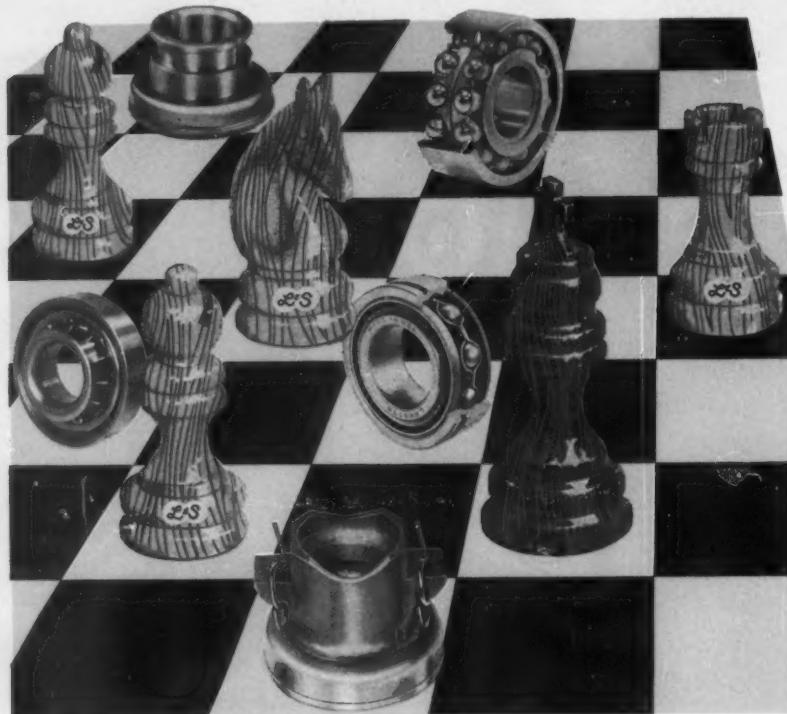
O-ring from the front side of the diaphragm.

To disassemble the control valve plunger, remove the hub rear seal adapter from the valve plunger assembly, and remove the seal from the adapter. Remove the O-rings, the seal, and the fibre gaskets from the plunger. If the plunger assembly needs to be replaced, hold the plunger firmly and pull out the valve operating rod with pliers.

Note: Do not remove the operating rod from the plunger unless the plunger is to be replaced.

Cleaning And Inspection

Immerse all metal parts in a suitable solvent. Rubber parts should be cleaned in alcohol and blown dry with compressed air and make sure internal passages are open. Always discard all used rubber parts. Inspect all other parts for damage or excessive wear and replace any that are damaged or excessively worn. If the inside of the booster body is rusted or corroded polish it with steel wool or fine emory cloth. Replace the body shell if it is scored. Inspect the master cylinder for signs of scoring, rust, pitting, or etching. If any of these conditions are present, replace the master cylinder.



CHECKMATE your bearing problems with our complete line!

Your move will be effective when you replace with L & S Bearings. You'll have the satisfaction of knowing there is a bearing designed for every automotive need . . . plus the assurance of championship performance. Plan your strategy ahead . . . stock and sell L & S Bearings . . . the complete line . . . the profit line!

L & S BEARINGS

L & S BEARING CO. OKLAHOMA CITY, OKLAHOMA

Next Month . . .
Good Shopkeeping,
Tools and Equipment
Issue

Recollections

Continued from page 54

today's body types trace their origin to models which were the hits of their time in the days prior to World War II.

There was, for example, the five-passenger coupe with two auxiliary seats which could be folded out of sight when not in use. Seats of this type are still used on seven passenger limousines, and occasionally on smaller capacity models. Today's club sedan is probably its closest relative.

The club sedan of 1960 was yesterday's five-passenger coach, and the gay sport phaeton of the 1920's in today's snappy convertible.

The widely used station wagon so popular today is a relative newcomer. It was first offered in the 1930's, but today accounts for a sizeable portion of total production. The population shift to the suburbs is largely responsible for the growing popularity of this body style.

Internal Combustion Engine . *Continued from page 90*

the noise level of the Diesel as compared with the Otto engine. Diesels at one time, were hard to start. However, that has been overcome by advances in starting motor design. The main and outstanding advantage of the Diesel is, of course, its fuel economy. This alone in many instances is sufficient to warrant the use of the Diesel engine. As an example; in London, England, there are about 5000 Diesel taxi cabs. The switch to Diesel by the London cab companies, it has been reported, resulted in over 50 per cent saving in fuel economy.

The Otto Cycle internal combus-

tion engine of the four-stroke cycle type is still found to be the most suitable type for passenger car service in America. It is quieter, more flexible, lighter, less expensive (first cost) and for many other reasons too involved to cover in this basic discussion.

The two engine types, the Otto and the Diesel are never the less similar in construction and service. The visible difference is of course the type of fuel metering device used. The Otto engine with its car-

buretor and the Diesel with its fuel injector system. Next month we will cover the Two-stroke cycle principle of engine operation and at a later date the Diesel will be covered in a lesson by itself.

Sample of Basic Electricity Test III on page 88

Review of
Test II
on page 124

Motor Age's Calendar of Coming Events

Nov. 8-10—Automotive Parts Re-builders Assn. Convention & Trade Show, Hotel Biltmore, Los Angeles, Calif.

Dec. 7-14—Automotive Electric Assn. 44th Annual Meeting and Manufacturers-Distributors Conference, Edgewater Beach Hotel, Chicago, Ill.

Dec. 9-11—8th Annual Auto Trim Show-Convention, Hotel Ambassador, Los Angeles, Calif.

Jan. 7-9—Fort Worth Auto Show, Will Rogers Exhibit Bldg., Fort Worth, Texas

Jan. 14-17—National Independent Automobile Dealers Assn., Stardust Hotel, Las Vegas, Nev.

Jan. 25-26—National Forum on Automotive Air Conditioning, Statler-Hilton Hotel, Dallas, Tex.

Jan. 26-28—Birmingham Auto Show, Municipal Auditorium, Birmingham, Ala.

Feb. 3-7, 1962—National Automobile Dealers' Assn. Convention & Exhibition, Convention Hall, Atlantic City, N.J.

Feb. 21-25—12th Annual National Autorama, Connecticut State Armory, Hartford, Conn.

New **ARMSTRONG**
"90" RATCHET

*The ONLY Ratchet with
ALL these important features!*

① Slenderized head
② Thumb-operated reversing lever specially designed so it won't come off
③ Reversing-lever stop (Ball-and-spring prevents accidental shifting)
④ Simple to clean—only tool required is a Phillips screwdriver (wearable parts may be individually replaced)
⑤ Thin handle with knurled grip
⑥ Hole in handle for convenient hanging
⑦ Fine-toothed gear
⑧ Easy ratcheting action
⑨ 1/4", 3/8", and 1/2" square drives (two handle lengths in 1/2" drive)

1/2" 3/8" 1/4"

All wearable parts are replaceable; individually, inexpensively, easily. With no teeth cut into handle, it need never be replaced. *ARMSTRONG* on these ratchets guarantees advanced design, top quality and tool sense.

Extra heavy duty "90" Series ARMSTRONG ratchets (see right) in 1", 3/4", 1/2" and 3/8" square drive sizes. Our General Catalog 700, gives complete information on these and approximately 5500 other ARMSTRONG tools. Your local ARMSTRONG Distributors will supply you a Catalog and demonstrate the new ratchets. If you don't know who he is, write us for his name.

ARMSTRONG BROS. TOOL CO.
5266 W. ARMSTRONG AVE. • CHICAGO 46, ILLINOIS

Chrysler joins the list of great new silvery-plated

Champions are the favorite spark plug with automotive engineers everywhere—by an overwhelming majority! In fact, throughout the world more than twice as many car makers install Champions! Here's the reason—an important one to you and your customers . . .

The reason is *performance!* No one has ever built a spark plug that can outperform a Champion. What's more, no other spark plug comes anywhere near matching Champion's great number of records and victories in outstanding speed and performance events. (For example: Champion-sparked cars have won 11 of the last 12 Indianapolis "500" races. Champion-equipped cars have won every "Daytona 500" stock-car race. And Champions have sparked the victor in every single Darlington "Southern 500" stock-car classic.)

These records and victories are important because they are one way of demonstrating the qualities of Champion-sparked performance. What do they show?

They show that new silvery-plated Champion spark plugs are dependable—in any kind of engine and in any kind of driving. Champions can be depended on for sudden bursts of all-out acceleration—time after time. Champions can be depended on for smooth, full power—hour after hour. Champions can be depended on to spark

CHAMPION SPARK PLUG

MOTOR AGE • November 1961

Corporation car makers who install Champion spark plugs!

every last drop of power and performance from every drop of fuel.

In short, these Champion-sparked records and victories show that *every engine does its best with Champion spark plugs!*

And Champion builds a spark plug to produce outstanding performance in *every make* of car your customers drive. Whether it's built by Chrysler Corporation, General Motors, Ford Motor Company, American Motors, Studebaker-Packard or any of the major foreign makers—Champion has the right spark plug for it.

So next time you put spark plugs in a customer's car, remember this: Champions are the overwhelming first choice with automotive engineers—because of their outstanding performance! This same great performance is a good reason for *you* to choose and install silvery-plated Champions—in *every make* and model of car!



All these great car makers factory-install Champion spark plugs

UNITED STATES

American Motors Corporation
Checker Motors Corporation
Chrysler Corporation
Studebaker-Packard
Corporation

B.M.W.

Cisner
Citroen
Fiat
Ford
Innocenti & Company
International
Lancia & Company
Porsche
Simca

LATIN AMERICA

Dinborg-Industrias
Arg. Automotrices S.A.
(Borgward)
Industrias Kaiser
Argentina S.A.
Ford Motor Company
Siam Di Tella
Automotores S.A.
Vemag S.A. (DKW)
Volkswagen do Brasil S.A.
Willys Overland do Brasil S.A.

FAR EAST

British Motor Company
(Austin, Morris, MG,
Wolseley)
Canada Cycle and Motor
Company (Vic.)
Pty. Ltd. (Studebaker)
Fiat of Australia Ltd.
Ford Motor Company
Ford Motor Company of
Malaya, Ltd.
Ford Motor Company
of New Zealand, Ltd.
Rootes (Australia) Ltd.
(Hillman, Humber,
Sunbeam, Commer)
Willys Motors
(Australia) Pty., Ltd.

ENGLAND

Allard Motor Company

Alvis

Berkeley

British Motor Corporation

(Austin, Austin-Healey,

Metropolitan, MG,

Morris, Princess,

Riley, Wolseley)

Chrysler Motors

Citroen Cars (England)

Daimler Company

Fairthorpe

Ford Motor Company

Jaguar Cars

Jensen Motors

Layout Sports Cars

Lea-Francis Cars

Lola Cars

Lotus Engineering Company

Morgan Motor Company

Rolls Royce

(Rolls Royce and Bentley)

Rootes (Hillman, Humber,

Singer, Sunbeam)

Rover Company

Turner Sports Cars

EUROPE

Auto-Union DKW



COMPANY • TOLEDO 1, OHIO

MOTOR AGE • November 1961

Detroit Report...

Rubber Gas Tanks

Some Detroit manufacturers are seriously studying airline experience with flexible fuel tanks as a means of reducing the hazards of fuel fires in auto collisions. Fuel-tank and fuel-line ruptures, with resulting violent fires, are not as rare as you may think.

Chevrolet, among others, has artificial-rubber tanks in prototype. As unlike conventional tanks as black is from white, they consist of tubes four to five inches in diameter and seven to nine feet long. Two of these are snaked into a car's rigid steel frame. A single filler neck serves both big tubes. Flexible hoses connect the tubes to the carburetor. A unitized body would be no problem; a protective metal sheathing for the tubes could be incorporated into the design.

Flexible tanks would have side advantages. Trunk space, now sacrificed in part to fuel storage, would be increased. Vapor lock, occurring in the hot metal tubing leading from tank to engine, would be eliminated. Some of the disadvantages: The flexible tanks are tougher to service and replace, and hooking up an accurate fuel gauge is nearly impossible.

Ford Money Savers

Ford '62 trucks now make saving money a full-time business. You have over 600 models to choose from . . . and there is a truck just right for your job . . . whatever your job is. Ford tells us you save on price, gas, oil, and on tires and maintenance. In other words, wherever there is a way to save \$\$\$. . . you can do it with a Ford Truck.

All For \$1,000?

Speaking of imports, watch for the possible introduction of a spectacularly low-priced car from Japan. Already reaching into the U.S. pocket-book with their fine cameras, the Japanese have an eye on the market here for a car with the general characteristics and looks of the Karmann-Ghia Volkswagen—but with a retail price of about \$1,000. That would be considerably less than half the price of the Karmann-

Ghia. The car in question sells in Japan for \$790. The manufacturer figures he could get it across the Pacific and pay the duty with \$200 or so. Could be bad news for other imported mini-cars and Detroit compacts.

Get 'Em Up

GIVE YOUR CAR A LIFT *



FOR SAFETY, COMFORT & SAVINGS

* Trademark of the National Lubricating Grease Institute

Over 99 per cent of the cars on the road today must be lubricated regularly. It's the smart dealer who gets his customer's car up on the rack for extra business. By getting the owner under the car while it's on the rack, extra sales can be made—new tailpipe—new muffler, etc. Educate your customers to get that car on a lift every 1,000 miles for a grease job and safety inspection.

'62 Corvair Monza

Here's the car that started the bucket-seat brigade. Here are bigger brakes combined with that special Corvair blend of rear-engined traction and precision steering to give a more secure command of the road. Saucy new styling accents and tasteful interior trim make the Monza a must!

Automatic Box For Midgets

Of all the features on U.S. cars that foreign-car makers covet, the automatic drive rates the highest. Many a potential customer is scared out of a foreign-car showroom when his wife exclaims in dismay, "It's cute, but do I have to shift gears?"

Thornton Products Co. of Dearborn, Mich., has the patent rights to a new kind of automatic transmis-

sion that is said to be particularly adaptable to cars of less than compact size. That's because the transmission is only three-fifths as big and heavy as a conventional torque converter or Hydra-Matic. Moreover, it supplies infinitely variable gear ratios, resulting in a silk-smooth power flow. In that respect it compares with Buick's Dynaflow, though it gives better fuel economy. Its greater efficiency makes it practical for low-powered engines.

As durability testing nears completion, many foreign manufacturers are sniffing expectantly at Thornton's doors.

Gus Wilson's

A regularly monthly feature
of Popular Science

Gus was tired but he couldn't relax or keep his mind on the TV screen. Something was nagging at him—something about one of the day's customers. Couldn't be Tom Hawley. That was just funny. Tom had broken off a plug on his beloved '39 Caddy and nearly had a fit before Gus got it out without damaging the engine. Was it Harry Towne, the young fireman

POPULAR SCIENCE READERS

Self-Starting Car For B-r-r-r Weather

The day of auto gadgets hasn't flown with the coming of simpler, smaller vehicles. One Detroit manufacturer has developed a self-starting car for the coming winter days. At its heart is a timer—the same thing that turns on a radio automatically, controls the cycles in your washing machine, or turns off the heat on the roast in the oven.

Want to leave the house in your car at 7:45 in the morning? Set the timer for 7:35. It will switch on the ignition, turn over the starting motor, and warm up the engine for you. Leave the heating system controls in the "on" position the

from Popular Science

355 Lexington Avenue, New York 17, New York **Monthly**

night before—and presto! A warm, cozy car is waiting. An automatic choke, of course, is vital.

One question remains unanswered: how to vent exhaust fumes out of the closed garage without having to hook up a flexible hose to the tailpipe.

The manufacturer still hasn't decided whether to market the gadget now or later. It would be an extra-cost option.

Le Mans—Fancy & Frisky

Pontiac's new Le Mans is a package of punch, push and available at low prices in Convertible or Coupe. Plush sports-type bucket seats and full carpeting are part of

Model Garage

who wanted his car in a hurry to take his girl to the drive-in movie? Gus turned back to the violent adventures of a TV private eye... And suddenly he knew what was wrong. Then he was on his feet, rushing out into the rainy night, and praying he could make the drive-in in time to save two lives. See Nov. P.S.

ARE YOUR BEST CUSTOMERS

the package. Plenty more—front engine balanced by rear transmission, independent suspension at all four wheels. Big 15-inch wheels and tires at no extra cost.

Get Maximum Action With AC Spark Plugs

AC Fire Ring Spark Plugs are designed and built for the fast power-producing action of today's high octane gasoline and high compression engine.

AC Fire Ring Spark Plugs feature heat bonded inner seals for positive protection against gas leakage and overheating—massive chrome-nickel-barium electrodes for longer electrode life—and exclusive Hot Tip that heats faster and cools faster

for sustained smooth power performance.

Cutlass Zip And Dash

A car the size of an Olds F-85 needs the lively get-up-and-go—the zip and dash—a V-8 can deliver. The ultra high compression Cutlass 185 aluminum V-8 Engine does a fine job. Cutlass 185 Engine: 185 h.p., 10.25-to-1 compression ratio; 230 lbs.-ft. torque at 3200 r.p.m.; Multi-jet 4-barrel carburetor; High-torque 3.36-to-1 axle ration. All standard equipment on Cutlass models.

Sterling Service

Champion introduces a new silvery-plated spark plug . . . which has more



CHAMPION

than 10 times the resistance to rust. These silvery-plated plugs were first made for the world's finest aircraft and marine engines. Cost? No less than ordinary plugs. How many do you want?

The New Chevy II

Here is a totally new line of thrifit cars from Chevrolet, encompassing a whole new concept of engineering simplicity to clamp down on service and maintenance cost. Bolt-on front fenders, roomy engine compartment and easy accessibility of adjustable components are just a few of the extra maintenance advantages of Chevy II's unique design.

Thrifty 4-cylinder engine (also satin-smooth 6) wrings extra miles out of a gallon of regular. Unique Mono-Plate rear springs do away with the friction and harshness of old-style springs to give you a remarkably smooth ride. These and a host of other surprises in nine spanking new-sized models, including station wagons and the soon-to-come hardtop and convertible.

The new Chevy II is built for people who want modern basic transportation in the best Chevrolet tradition . . . the kind of transportation Chevrolet has always provided.

Leading Advertisers Appearing In The November Issue Of POPULAR SCIENCE

Buick Division
Buick Special
Pontiac Division
Tempest

The Electronics Division of General Motors
AC Spark Plugs

Pennsylvania Refining Company
Gumout

Kendall Refining Company
Motor Oil

Oldsmobile Division
Cutlass
Champion
Spark Plugs

Chevrolet Division
Chevrolets

Briggs Shock Absorber Company
Shock Absorbers

Ford Motor Company
Trucks

Motorcraft Division
Ford Motor Company
Autolite Spark Plugs

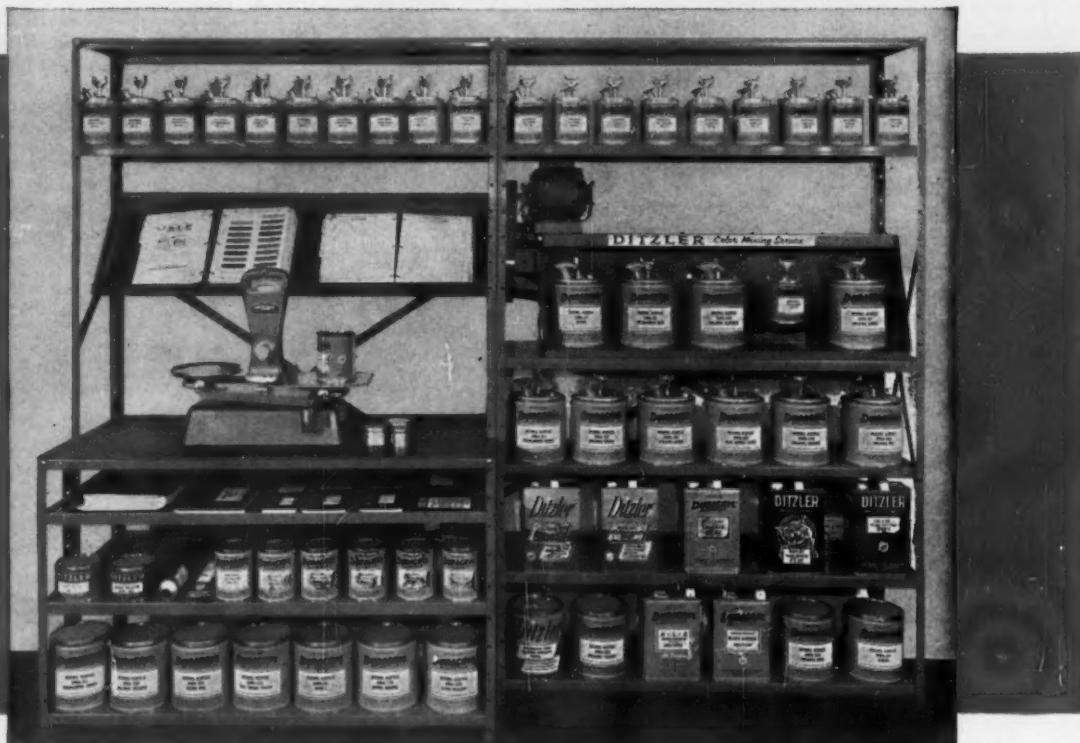
J. C. Whitney Company
Floor Shift Conversion Kits
Harley-Davidson
Motorcycles & Scooters

AMERICA'S FOREMOST AUTOMOTIVE MARKET



ON SALE — AT YOUR NEWSSTAND

Now... Cash in on 3 years' experience that has perfected Ditzler's Acrylic Color Mixing Service!



• **DITZLER SHELF-SHOP MIX.** For the shop with limited shelf space. This compact unit comes in two sections. Requires only 16 sq. ft. of floor space, and wall space just 8 ft. wide and 7 ft. high. Can be used in straight line or in corner.

Refinishing shops all over the country have used DITZLER's Acrylic Color Mixing Service with unvarying success for three years. DITZLER research chemists and technicians have combined the results of this practical experience with tireless laboratory tests and studies to refine and perfect pigments, chemical content and formulations so that this system today is farther ahead than ever of all others.

• With this time- and cost-saving mixing service you can now match more precisely and quickly the rich beauty, luster and rugged durability of the acrylic finishes on many of today's cars. And you do it with true acrylic colors—not just modified lacquers.

DITZLER COLOR DIVISION, Pittsburgh Plate Glass Company, Detroit 4, Michigan... Torrance, Calif.

• No waiting for delivery of needed colors. With the complete range of base colors and laboratory-tested formulas you serve customers more quickly, efficiently and economically. And you need only to mix the exact amount for a spot repair or complete repair job. No waste. No costly inventory of half-used or slow-moving colors.

• Now . . . cash in on the 3 years' experience which has given DITZLER's Acrylic Color Mixing Service even a more decisive leadership in this field.

• Whether your shop is large or small, you'll find this one of your more profitable investments. Call or see your nearest DITZLER jobber for details.



• DURACRYL® acrylic finishes, exclusive products of Pittsburgh Plate Glass Company and its DITZLER and FORBES divisions, are used on the production lines of all car manufacturers applying acrylic finishes as original equipment.



DITZLER®

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

**GET
THIS**

PURE VINYL RAINCOAT

**WITH EACH CASE
OF TUNG-SOL
HEADLAMPS**



- PURE VIRGIN VINYL, G-5 PLASTIC
- HEAT SEALED, STITCH-REINFORCED SEAMS
- SLASH POCKET HOLES
- ARM VENTS
- STYLISH RAGLAN SLEEVES
- SNAP FASTENERS
- SMART TRANSPARENT GREY COLOR
- PERFECT FOR DRESS OR WORK
- AVAILABLE IN MEDIUM AND LARGE SIZES
- MADE IN U.S.A.



CONVENIENT CARRYING CASE

See your supplier for details
OFFER LIMITED—ORDER NOW



TUNG-SOL® AUTOMOTIVE PRODUCTS DIVISION
TUNG-SOL ELECTRIC INC., NEWARK 4, N.J.



Why foam means fade—All shock absorbers, including the new improved Columbus, cushion road shock by using a valved piston acting against a column of fluid. If the piston meets only light fluffy foam, instead of vastly more resistant fluid, control turns to mush. A hop, skip and jump ride results.

BUT IN A SHOCK ABSORBER
FOAM MEANS **FADE**



get the BIG DIFFERENCE—get...

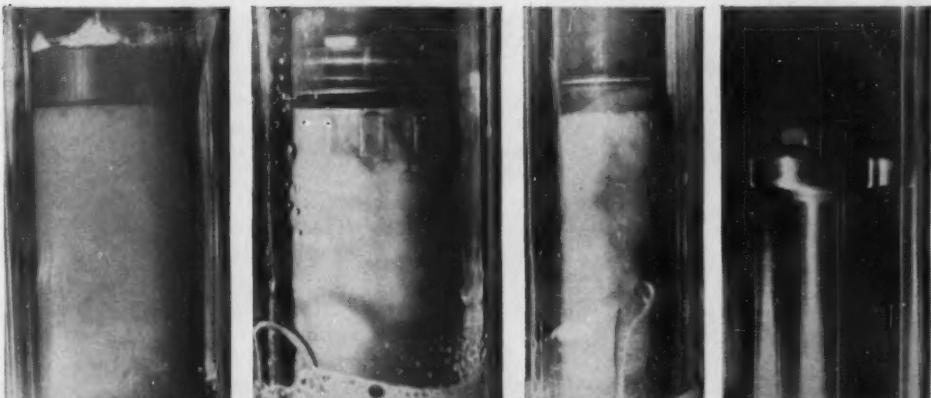
BRAND "A"
(Premium Duty)

BRAND "B"
(Heavy Duty)

BRAND "C"
(Regular Duty)

COLUMBUS

At right are unretouched high-speed photographs of actual shocks* under identical laboratory tests duplicating road conditions. Substitution of clear plastic shells shows that in all three other brands the fluid turned to foam. Only Columbus provided foam-free full-time control.



SEE HOW ORDINARY SHOCKS FOAM, FADE, LOSE CONTROL

only **COLUMBUS** full-time shock absorbers FIGHT FOAM ALL WAYS

Ordinary shocks foam, fade, lose control— Ordinary shocks have an air reserve at the bottom and sides of the fluid-filled working chamber. Each up stroke of the piston sucks air into this fluid, causing foam. And mounting this fluid chamber to the road-pounding wheels shakes all the fluid all the time—means more lost control.

Why Columbus gives full-time control—Only patented Columbus has the air reserve above the fluid—keeps fluid and air apart so they can't mix. Only Columbus mounts "heads-up"—with the fluid chamber on the smooth-riding frame, not the bouncing wheels. And Columbus' exclusive design fights foam in other important ways too!

Columbus bigger piston assures full-time control— With COLUMBUS, the much larger working chamber permits a much larger piston. This in turn allows larger, more sensitive piston valving which gives COLUMBUS shocks truly progressive, double-acting control for all road and load conditions.

Up to now, an oversize piston has meant premium price for premium performance. But regular-priced Columbus Luxury-ride shocks give you a larger piston than any shock available, with the exception of the super-priced shock of one competitor.

Even the economy priced Columbus Velvet-ride has a bigger piston than most regular priced ordinary shocks. Give your customers premium quality at regular price with Columbus! Register with your wholesaler as a Columbus Shock Specialist today!

*Shocks used were purchased on the open market in June of 1960.

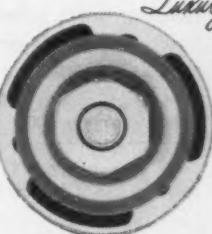
Competitive Piston



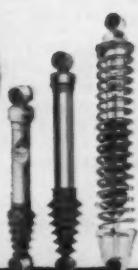
Velvet-ride



Luxury ride



Velvet-ride
Luxury-ride
Level-ride



FULL-TIME **COLUMBUS**

THE COLUMBUS PARTS CORP., DEPT. 103 - 1801 SPIELBUSCH AVE., TOLEDO 1, OHIO / A SUBSIDIARY OF THE AP PARTS CORP.

SHOCK
ABSORBERS

LICENSED BY DE CARBON

SAVE HOURS -KNUCKLES



Do 11 Jobs Fast!

RATCHETING SPARK PLUG SOCKET. Replaces three tools. Makes possible torquing of plugs in accessory-packed cars.



SPI-1426 \$1.95

FILLER PLUG WRENCH. Speeds, eases removal of Ford and Mercury differential hex filler plug.



J-42 \$1.11

IMPROVED HOSE CLAMP PLIER. Features special finger tip position lock that frees both hands.



No. 175 \$2.71

TWO-IN-ONE SOCKET. Step-down opening services both stop light and oil pressure light switches. Will not break switch seal.



J-43 \$1.77

CHRYSLER EMERGENCY BRAKE ADJUSTMENT WRENCH. Only tool needed for internal emergency brake adjustment on all Chrysler-make cars.



No. 282 \$1.37

BENDIX BRAKE TOOL. Both ends designed to adjust all type Bendix brakes. Extra long!



No. 392 \$1.74

SHOCK ABSORBER TOOL. Three tools in one. Insures quick installation-removal of shocks on all General Motors, Ford and Chrysler-make cars.



No. 2280 \$1.95

WRITE FOR COMPLETE CATALOG



"E" Stick

Continued from page 74

flywheel in the regular manner and uses a throw-in-throw-out fork and thrust bearing like a conventional unit. The clutch linkage is equipped with a manual cable for parking the car in gear.

The E-Stick shift requires an automatic means for engaging the clutch during the operation of the car. This is accomplished by a combination of engine oil pressure and engine manifold vacuum. These are timed by driver manipulation of the shift lever which operates a microswitch. This in turn actuates a solenoid operated vacuum valve applying oil pressure. Engine oil pressure is used to apply the clutch. The pump connections will be noticed in the illustration. An oil actuated servo assembly is utilized to apply the clutch in response to engine speed and torque, providing a smooth start similar to that of an automatic transmission. Following engagement, clutch pressure is maintained and controlled by manifold vacuum.

Initial movement of the shift lever releases the clutch quickly by means of a micro-switch on the column actuating a small solenoid valve. This "dumps" the servo pressure into the suction port of the engine driven pump. Completion of the shift re-establishes clutch pressure according to the torque of the engine at that moment.

Both the release and initial engagement movements of the servo are made rapidly through the generous oil ports between the pump and servo, but the final engaging motion is "checked" by an orifice in a free floating disc after the first 1-1/4 cubic inches of oil has entered the servo. This gives the engine time to accelerate to avoid the feel of a torque reversal.

FACTORY "REPS" WANTED NOW!

30 Specialists in automechanics, impact air hammers, and/or autobody repair tools. Direct & jobber sales of most revolutionary air gun attachment in 20 years! 2000 units and 1 year's research prove 9 out of 10 demonstrations result in sales. Full particulars, photo, references first letter, please. Strictly confidential.

Box 17, Motor Age
5601 Chestnut St.
Philadelphia 39, Pa.

Review of Test II

READERS' replies so far indicate that Test II was a snap, that is, it was like a snap of a velvet whip. The questions most frequently marked wrong were review questions on Lesson I. It is suggested that those readers who marked Numbers 2 and 8 incorrectly should read the review of Test I on page 132 of the September issue. This should help clear up any questions you may have regarding the marks on the return post card.

The remainder of Test II questions were quite satisfactory. Nearly everyone received at least an 80. However, two questions caused somewhat of a problem because some answered them incorrectly; they were Numbers 4 and 6. Question #4 was: Voltage is the electrical term applied to:

- a. Current flow
- b. Electrical resistance
- c. Electrical pressure
- d. Electrical conductors

The correct answer is of course (c) *Electrical pressure*. Quite a few of our readers answered (a) Current flow. We call the attention of those who answered this one incorrectly to the left hand paragraph on page 67 of the August issue of MOTOR AGE. As follows: The higher the voltage or difference in electrical pressure, the greater the electron flow. Voltage can be compared with the pressure developed by a pump in a water system.

Question #6 was: If the North pole of a magnet is placed near the South pole of another magnet what will they do?

Some readers answered (a) and others answered (d). The correct answer is (b). *They will attract each other*. Remember the rule for magnetic attraction and repulsion? *Like poles will repel each other and unlike poles will attract each other*. Those that answered (d) must have had those little magnetic "scotty dog" novelties in mind.



Wheel Alignment of the Future - here Today!

John BEAN LIFT-A-MATIC

no other aligner can match these features!

LOW SPACE REQUIREMENT: Rack is only 15½ feet from tip to tail, yet puts full-scale wheel alignment service in a single service bay. Eliminates runway approaches, keeps driveways clear, handles the largest standard American passenger car. Handles up to 6000 lbs. weight at 150 lbs. air pressure.

REMOTE CONTROL AIR LIFT: Push-button automation: Just drive the car on the rack, reach out and push the button and air cylinders lift car into aligning position. Fast, positive, safe.

VARIABLE-TREAD RUNWAYS: Variable 40 to 68 inches on giant, non-binding rollers. Handles conventionals, wide-tracks, compacts, sports, imports . . . you'll never turn a car away!

MECHANIC'S DREAM: Roller-bearing mounted runways glide at fingertip touch. Clear-center construction is 41½" wide, runway height just 20"—perfect for working from creeper.

EXCLUSIVE "SHAKE-OUT": No need to turn swing-axle cars around to align rear wheels. A couple of "bounces" on the easy-moving runways, and wheels assume normal road position for fast, accurate aligning.

NO PIT PROBLEMS: Lift-A-Matic installs anywhere (even on the second floor). No need for expensive pits. Can even be relocated if necessary.

AUTOMATIC SAFETY: Safety leg supports runway if air supply should fail. Safety runway guards automatically hold until released by push-button.

AS YOU LIKE IT: Lift-A-Matic is available with Visualiner optical heads, mechanical or magnetic gauges, as a rack only or as a modernizer or conversion kit to up-date your present equipment.



PUSH BUTTON AIR LIFT CONTROL

Operator drives on Lift-A-Matic Rack, presses button while still in driver's seat. Air lift puts car in aligning position automatically!

FREE CATALOG:

You've never seen anything like Lift-A-Matic, because there is nothing like it! Remedy that situation by calling your John Bean jobber or writing us for a free catalog.



JOHN BEAN-BARRETT AUTOMOTIVE

JOHN BEAN DIVISION

Lansing 4, Michigan

Training Schools *Continued from page 62*

land, St. Louis and Minneapolis. Address inquiries to: Service Training Activities, GMC Truck & Coach Div., Pontiac 11, Michigan.

International Technical Training
Centers offer service training for both dealer and fleet customer personnel. The courses are one week in duration. Courses began during the first part of September and classes are concluded the first day of May. The schools do not func-

tion during the summer months. Classes are offered on Diesel service and gasoline engine service, covering service procedures on all motor truck components.

The Centers operate on a TELL-SHOW-DO method which gives each student an opportunity to actually perform the operations being taught. Classes are also held at various times during the year on service management for dealers.

There is no enrollment charge at the Training Centers. Each student, however, pays his own transportation to and from the school and his expenses while at the school.

For further information contact: J. H. Coomen, Supervisor, Dealer Service, Motor Truck Division, International Harvester Co., 180 N. Michigan Ave., Chicago, Illinois.

Motor Truck Technical Training Centers

International Harvester Co., Motor Truck Technical Training Center, 580 Whitehall St., W.S., Atlanta, Ga.—Supervisor—Mr. D. A. Kelly

International Harvester Co., Motor Truck Technical Training Center, 1809 S. Lamar St., Dallas, Texas—Supervisor—Mr. B. E. Worthy

International Harvester Co., Motor Truck Technical Training Center, 712 South Cameron St., Harrisburg, Pennsylvania—Supervisor—Mr. J. E. Biden

Mack Trucks, Inc. started their fall training courses in October of this year. Two full weeks of training is strongly recommended; however, either courses in Diesel or Drive line can be taken separately.

The Engine course primarily emphasizes maintenance practices conducive to economical operation and full life expectancy. A separate course in approved rebuilding methods is presently under consideration.

Classes scheduled through December 1961 begin Monday morning on the dates listed below:
November 27, 1961 Diesel Engine
December 4, 1961 Diesel Engine
December 11, 1961 Clutch, Transmission, Carrier, Power steering.

There is no tuition fee, but students are required to pay their own travel, motel and living expenses.

Application for attendance must be made through the nearest Mack Branch or Area Representative Office and forwarded to: Service Training School, MACK TRUCKS, INC., P. O. Box 311, Route 22, Somerville, New Jersey.

TORQUE WRENCHES



This Mark* Guarantees:

1. Guaranteed accurate forever within 2% of maximum scale reading.
2. The only wrench that permits accurate use of adapter & extensions. Patented pivoted handle permits concentrated load position—the only way to obtain accuracy with adapters and extensions.
3. Rugged construction. Can be stored in a tool box with other tools.
4. Easy to use as any socket wrench.
5. Signalling models and direct reading styles to choose from.
6. A complete range to choose from to meet every service application.



Valve and Clutch Spring Tester

Test new as well as used springs. Match sets of valve springs for top engine performance. Check clutch springs to prolong clutch life.

FREE

Torque Specification Book for over 130 makes and more than 1200 models of automobiles, (U.S. and foreign) trucks, tractors, outboards, motorcycles, diesel aircraft, marine and small air cooled engines. Spark plug, wheel bearing, valve spring data and many helpful torque tips sent free upon request, write Dept. 618



PA **Sturtevant Co.**
ADDISON / QUALITY / ILLINOIS

Chevrolet's First 50 Years

Continued from page 104

transmission, panoramic windshield, ball-race steering, electric starter, headlight dimmer foot switch, power steering, power brakes, and many others. The Corvette, first plastic-bodied production sports car, was brought out by Chevrolet in 1953.

Corvair Introduced

In the fall of 1959 when, after years of research, the Corvair was placed on the market. The car pioneered a new quality ride in the small car field through the use of a rear-mounted engine of flat, air-cooled design and an unorthodox method of rear suspension.

As well as hundreds of thousands of miles of road test, the program involved the construction of new facilities. An aluminum foundry was built at Massena, N.Y. to fabricate parts for the engine. An assembly plant, since expanded and initiating several unusual manufacturing techniques, was established at Ypsilanti, Mich. Still another assembly plant, the thirteenth, was added at Framingham, Mass. to produce standard passenger cars.

History Making Monza

No story of the Corvair's success would be complete without reference to its history-making Monza. A sporty version of the model originally unveiled, the vehicle caught on with such swiftness that imitators soon popped up all over the industry. The spectacular sales of the Monza proved that while the public might savor low-cost operation in its automobiles, it also wanted a pervading air of distinction.

Beginning its fifty-first year, Chevrolet brought out still another pioneering vehicle in its 1962 line. Convinced of a sound demand for a car sized between its standard models and the Corvair, a full line of passenger bodies under the name of the Chevy II made its appearance. In addition to the Chevy II, its confidence in the continued popularity of the Biscaynes, Bel Airs, Impalas, Corvettes, Corvairs and commercial cars was proven by a broad array of bumper-to-bumper improvements.

Quality Service *Continued from page 72*

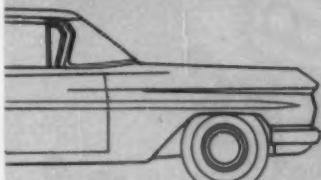
all of his needs supplied at his favorite service station. As a result, Ed expanded his services to include repairs, painting and the other chores demanded of today's station operator. In addition, he recently built a spacious showroom wherein he expects to handle a compact car dealership.

At the very outset, Ed steadfastly resolved to pursue a policy of downright helpfulness and

square dealing. His insistence on the old-fashioned virtue of honesty caused the station's expansion into painting and specialization in automatic transmissions, brake and front end work. The Jungle station is a mecca for work sent in by other station operators.

Many customers come from the ranks of those who have failed to receive prompt service either at the pumps or in other shops.

When the Car is Over 3



...it's time to change the

MOTOR MOUNTS

Motor mounts take quite a beating—and after 3 years "They've had it". Constant torque reaction and oil soaking reduces their effectiveness. Preventive maintenance experts recommend an automatic motor mount check-up on every car three years old or more.

IMPORTANT. Save time and grief—install motor mounts in sets—front and rear—and use the time saving installation assembly kits.

GO ALL THE WAY

USE THE TIME SAVING INSTALLATION ASSEMBLY KITS



Form No. 161



DOAN MANUFACTURING

A DIVISION OF ANCHOR INDUSTRIES, INC.

1725 LONDON RD.—CLEVELAND 12, OHIO

Don't Push The Panic Button . Continued from page 99

passenger cars of around 57 million. Add to this the 11 million trucks, 270,000 buses and 135,000 cabs and right now we still have a bank of over 68 million vehicles requiring conventional lubrication.

Question: What about the compacts?

All the compacts on the market in 1961 use lubrication fittings—anywhere from 9 to 19. In the pro-

duction of compacts, every fraction of a penny counts—even more than in standard size cars.

Conventional lubrication fittings are obviously much cheaper than the sealed pre-packed type and that is the reason why all compacts use ordinary fittings.

It may be, of course, that this picture will change in the future if the volume and production methods on pre-packed bearings brings

the cost down where they can be used on compacts.

A few months back, some of the best experts took the view that by 1963, 60 to 75 per cent of all production would be of the compact model. We all know, of course, that this picture has changed already and production of compacts seems to be leveling off—somewhere around 35 per cent—still a very important segment of the market for regular lubrication service.

Import Sales Decline

While the sale of foreign made automobiles or imports is on the decline, it should be remembered that all of these models require conventional lubrication with standard grease fittings.

New Imported Car Registrations*

August

	1961	1960	
Volkswagen	14,514	11,782	
Renault	4,538	4,569	
Volvo	1,320	2,207	
Triumph	1,241	2,014	
Mercedes Benz	1,146	1,913	
Fiat	989	1,838	
M.G.	943	1,800	
Austin Healey	906	1,565	
Metropolitan	890	1,320	
Simca	566	1,198	
All Others	6,574	11,094	
Total	34,227	Total	41,580

Eight Months

1961 1960

	1961	1960	
Volkswagen	117,073	100,056	
Renault	28,638	48,901	
Fiat	8,494	20,026	
Mercedes Benz	8,043	19,127	
Triumph	7,542	15,810	
Volvo	7,342	12,711	
English Ford	7,318	12,192	
Austin Healey	6,311	11,739	
Metropolitan	6,178	9,879	
M.G.	6,142	9,431	
All Others	52,565	All others	91,056
Total	256,238	Total	380,930

* Compiled from official state records. Data property of R. L. Polk & Co. May not be copied, sold or reprinted without Polk permission.

You Tell Me Your View—And I Will Tell You Mine

Continued from page 53

auto tags are issued to each car. As it stands now, a person can buy an old junk car, get a set of tags for it and usually have it inspected. He doesn't have to have insurance and doesn't even have to know how to drive unless he has an accident or gets caught.

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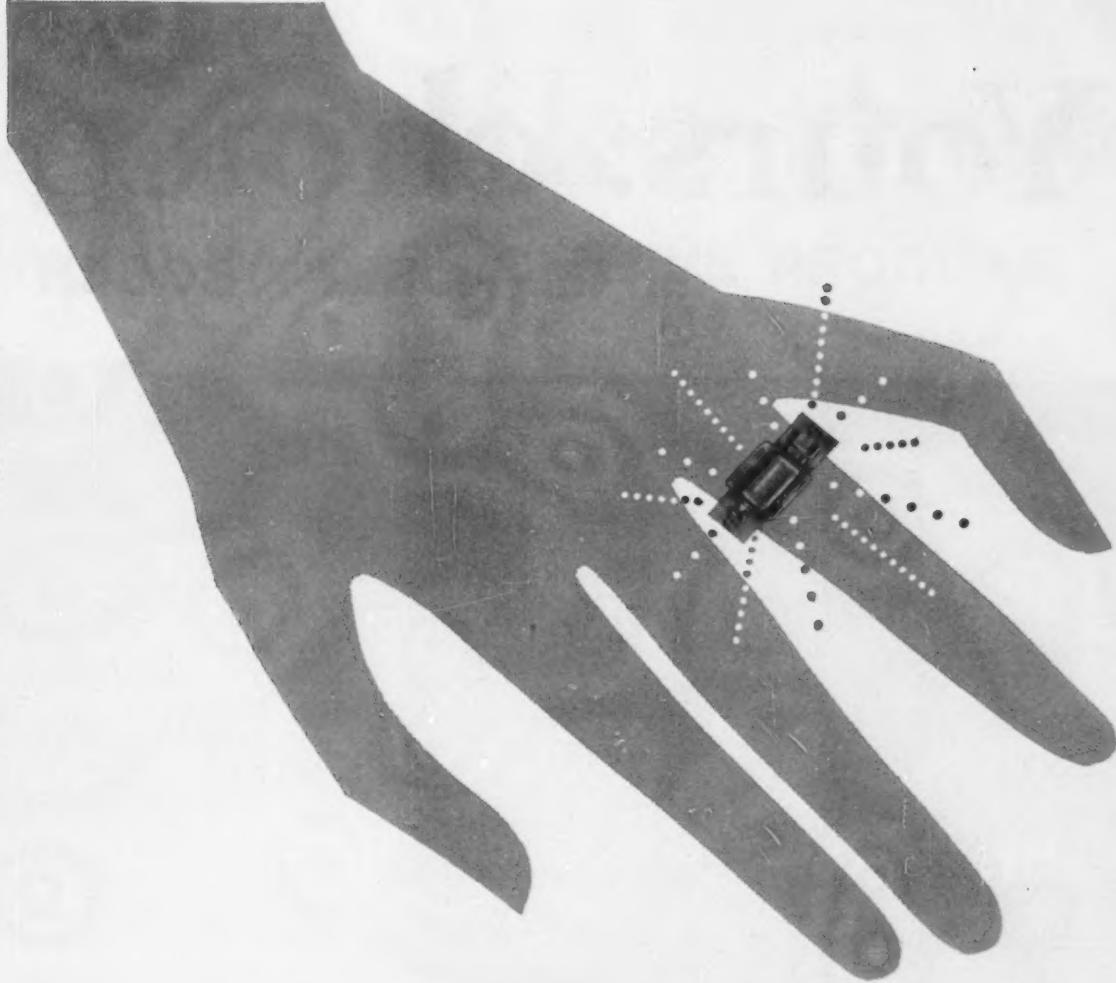
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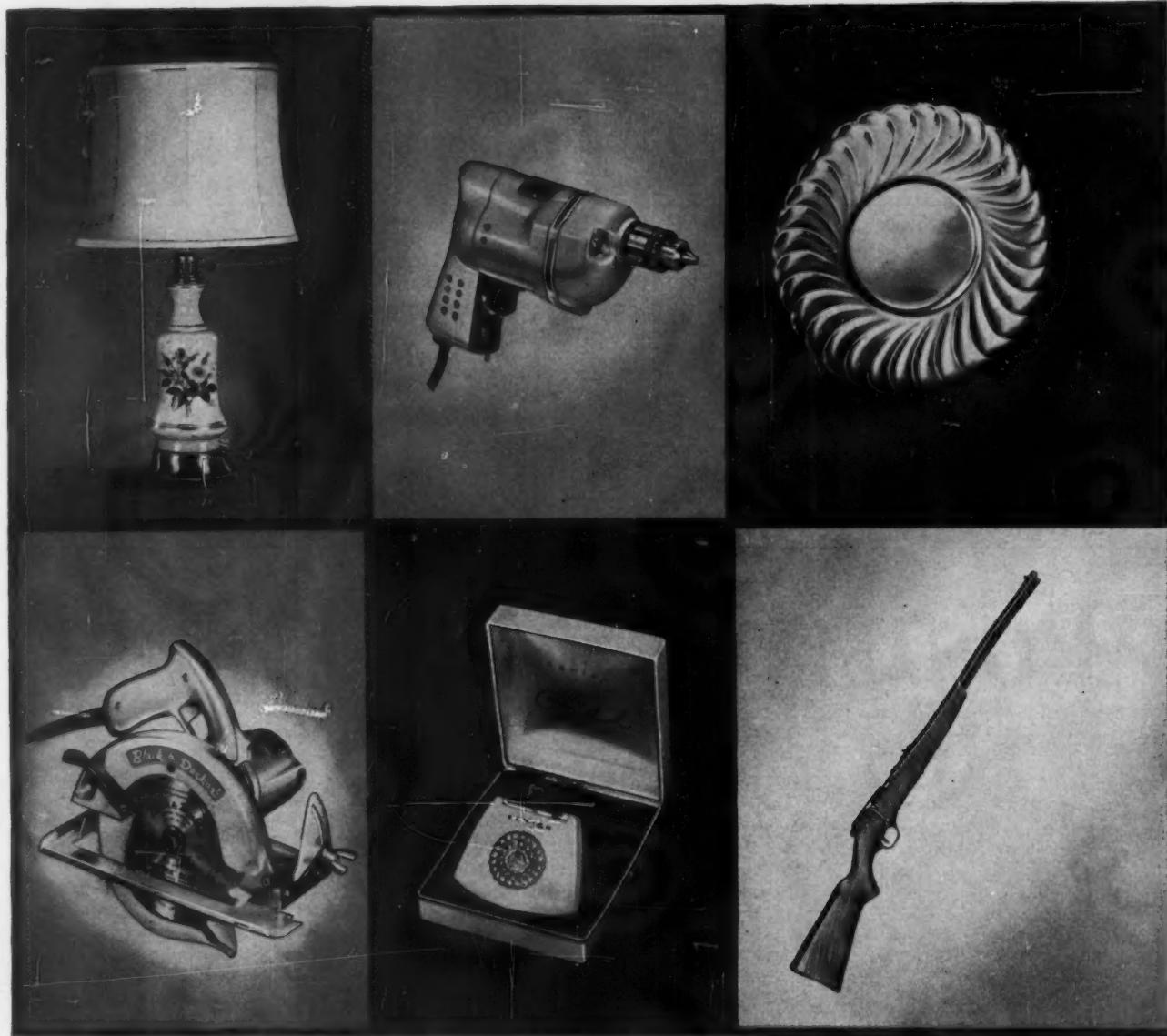


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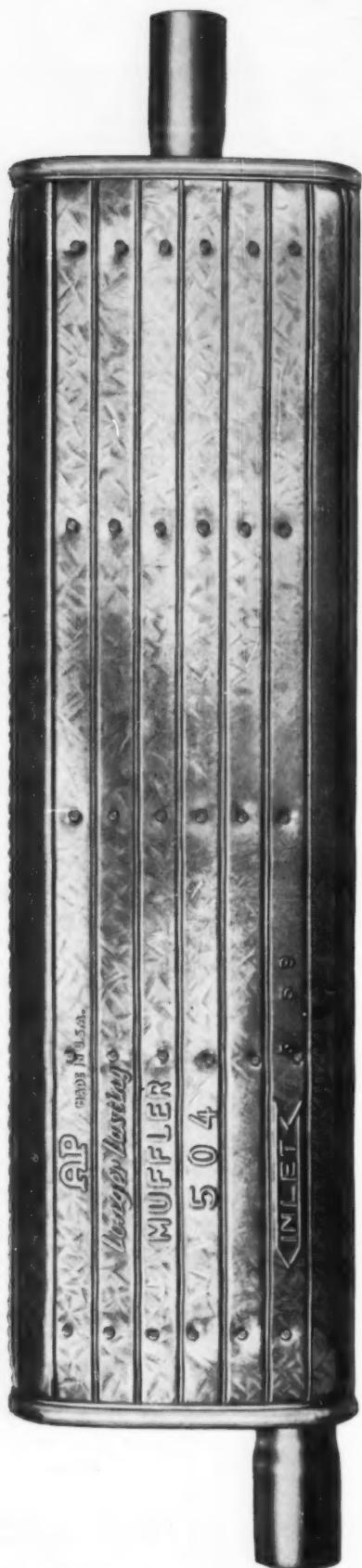


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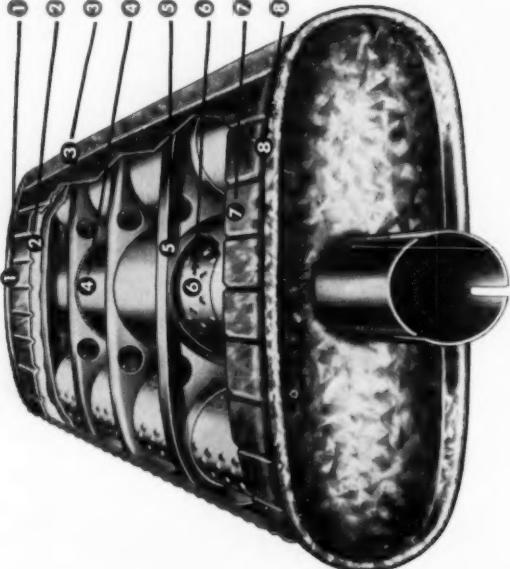
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